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REVIEW

OF

MATERIA MEDICA,

FOR THE USE OF STUDENTS.

BY

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Robert Troup Paine
to Harvard College.

With Illustrations.

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PREFACE.

THE dearth of elementary works on the Materia Medica proper, adapted to the use of American students, has long been felt. The *United States Dispensatory* and *Pereira's Materia Medica*, which are recommended as text-books to the lectures on this branch, in many of our medical schools, are too voluminous for convenient use for the purpose; and the numerous excellent treatises on *Therapeutics*, by American writers, are scarcely applicable to the subject as commonly taught among us. This little volume, though not intended as a systematic text-book, the author hopes may be found useful in supplying students with a condensed *review* of the elements of Materia Medica, as a guide to the courses of lectures delivered on this department in the United States. It makes no pretensions to rank among original treatises, but is designed to present the leading facts and principles usually comprised under this head, as set forth by the standard authorities.

The illustrations of the work have been limited to

representations of *indigenous* and *naturalized* plants, as most likely to be of practical use to the student. Most if not all of the important plants, which he may expect hereafter to encounter, will be found included in the list of illustrations. A like discrimination has been observed in the botanical descriptions of plants,—full notices of which have been confined to the *indigenous* articles.

The author begs leave respectfully to dedicate this attempt to facilitate the labours of the student of medicine in a most important branch of medical science, to the gentlemen in attendance on the various medical schools in the United States.

PHILADELPHIA, January, 1852.

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REVIEW OF MATERIA MEDICA.

THE agents employed in the treatment of diseases are denominated REMEDIES, and the branch of medicine which is devoted to their consideration is termed MATERIA MEDICA. Remedies may be divided into *Hygienic, Mechanical, Imponderable,* and *Pharmacological* agents.

HYGIENIC REMEDIES are usually treated of in works specially devoted to the subject.

PART I.

MECHANICAL REMEDIES.

MECHANICAL REMEDIES belong chiefly to Surgery. A few agents of this class are, however, employed in the practice of medicine, and are included in the Materia Medica. They are *bloodletting* (general and local), *setons, issues, bandages, friction,* and *acupuncture.*

1. GENERAL BLOODLETTING is performed principally by *venesection* or *phlebotomy,* which is usually practised on the median-cephalic or basilic veins of the arm—sometimes also on the external jugular and other veins. *Arteriotomy* is

occasionally resorted to, on the temporal artery, in cerebral affections.

Bloodletting is employed, to moderate vascular excitement, reduce inflammatory action, relieve congestion, allay spasm and pain, relax the muscular system, promote absorption, and arrest hemorrhage; and for these purposes it is our most available therapeutical resource. So powerful and exhausting an agent is, however, always to be resorted to with caution and discrimination; is not to be unduly repeated, even in inflammatory cases; and is seldom or never proper in diseases of a typhoid tendency, or where a tubercular diathesis is suspected, or in extreme infancy and old age.

2. The Local Abstraction of Blood is practised by means of *leeches* and *cups*. The leech (*hirudo*) is an aquatic worm, common throughout Europe, America, and India. The European leech (*H. medicinalis*), is from two to three or four inches in length, and is characterized by six longitudinal ferruginous stripes, the four lateral ones being interrupted or tessellated with black spots. The American leech (*H. decora*), is usually from two to three inches long, and is of a deep green colour, with three longitudinal dorsal rows of square spots. Both the imported and indigenous leech are employed in this country, but the latter makes a smaller incision, and is preferable in infantile cases. When the discharge of blood from leech-bites is excessive, it may be arrested by pressure, by compresses of lint, the application of alum, creasote, and other styptics, or by touching the wounds with nitrate of silver; and if these means fail, the wounds may be sewed.

In the operation of *cupping*, cupping-glasses and a scarificator are employed. The removal of atmospheric pressure, by the application of glasses partially exhausted of air, produces a determination of blood to the capillaries of a part, and it is afterwards readily drawn by scarification. When

blood is not abstracted, the operation is termed *dry cupping*, and is a valuable revulsive agent. The topical abstraction of blood by leeches and cut cups combines the advantages of depletion and revulsion. Leeches are employed in external inflammations, in situations where cups are inadmissible, and in infantile cases. Cups are generally preferable in internal inflammations, from their more decided revulsive influence. When blood is drawn by either of these agents, its continued flow may be promoted by the application of warm fomentations to the wounds.

3. SETONS (SETACEA) and ISSUES (FONTICULI), are employed when a permanent counter-irritant effect is desired. A *seton* is established by passing through the integument a seton-needle, armed with a skein of silk; or, a piece of tape, or a strip of sheet lead may be used for the purpose. An *issue* is made with a cauterant, usually potassa; and after the slough has separated, a discharge is maintained by the introduction of an issue-pea, for which purpose a common dried pea is used, or a dried unripe Curaçoa orange.

4. BANDAGES are employed, in the practice of medicine, to promote the absorption of dropsical effusions.

5. FRICTIONS are useful as revellents, and as local stimulants. They may be employed either with the dry hand, or with horse-hair gloves, or with liniments.

6. ACUPUNCTURE consists in the introduction into the body of fine, well-polished, sharp-pointed needles. It is a useful remedy in rheumatism, neuralgia, local paralysis, &c., and is sometimes conjoined with electricity, when the operation is known as ELECTRO-PUNCTURE.

PART II.

IMPONDERABLE REMEDIES.

UNDER this head are included *Light, Heat, Cold, Electricity,* and *Magnetism.*

1. LIGHT (LUX), exercises an important influence in the organized world as a vivifying stimulus. It is useful as a therapeutic agent, in diseases dependent on imperfect nutrition and sanguification; and the exposure of the surface of the body to its action, as far as nudity is compatible with proper warmth, promotes the regular development and strength of the organs. On the other hand, in many diseases the stimulus of light is injurious, and *darkness* is resorted to as a sedative and tranquillizing agent.

2. HEAT (CALOR), applied to the human system in moderate amount, acts, both locally and generally, as an excitant; in intense degree, it destroys vitality and organization. It is employed as a *local* excitant and revulsive, by means of hot bottles, hot bricks, &c., and as an application to painful and inflamed parts, in the form of poultices and fomentations. As a *general* application, heat is chiefly resorted to in the form of the water-bath and vapour-bath. The *warm bath,* at a temperature from 92° to 98° F., is used as a relaxant in dislocations, herniæ, spasm, &c., and also for its action on the skin in rheumatic and cutaneous affections. The *hot bath* has a temperature of from 98° to 112°, and is a powerful excitant, chiefly used in old paralytic and rheumatic cases. The *hot air-bath,* at a temperature of from 98° to 130°, is useful as an excitant and revellent, and is employed in cases of internal congestion, and in rheumatic, neuralgic, and

cutaneous affections. The *hot vapour-bath* is adapted to the same class of cases as the hot air-bath, and exerts also a diaphoretic and relaxing influence.

The destructive agency of heat is resorted to for the purpose of *vesication*, as by the application to the skin of a metallic plate heated to 212° by immersion in boiling water; and of *cauterization*, by the employment of red hot iron, or of moxa. Hot iron (known as the *actual cautery*), is used chiefly as a styptic. The term *moxa* is applied to small masses of combustible matter, which are burnt slowly in contact with the skin, with a view to a revulsive effect in deep-seated inflammations, nervous affections, &c.

3. Cold (Frigus).—The application of cold to living bodies produces a diminution of vital activity, attended by reduction of the temperature and volume of the part, with contraction of the blood-vessels and other tissues, and suspension of the secretions and exhalations. The application of excessive or prolonged cold is followed by the torpor and death of the part. When it is applied in moderation and for a short period, reaction generally takes place, with a return and even increase of temperature, volume, colour, and sensibility.

Cold is employed therapeutically, with a view to both its primary and secondary effects. The *primary* action of cold is depressing and sedative. As a sedative agent, it is used, 1. To lessen vascular and nervous excitement and preternatural heat, as by the use of cold lotions and spongings in fevers, the ice-cap in cerebral affections, the shower-bath in insanity, &c. 2. To constringe the tissues, promote the coagulation of the blood, and lessen the volume of parts; hence the local application of ice or cold water to abate inflammation, check hemorrhage, cure aneurism, and reduce strangulated herniæ.

The *secondary* effects of cold are the reverse of the primary

effects, and are obtained by the employment of a less intense degree of cold. They are resorted to, 1. To invigorate the system, as with the cold shower-bath and plunge-bath. 2. To rouse the system, as by cold affusions in coma and asphyxia. 3. To recall the vital properties to frost-bitten parts. 4. To effect local excitation, as by the application of the cold douche to rheumatic and paralysed limbs.

Cold liquids and ice are taken into the stomach as refrigerants in fevers. They are introduced into the rectum and vagina, to check hemorrhage and allay irritation; and cold water, injected into the impregnated uterus, is among the most certain means of inducing premature delivery.

4. ELECTRICITY (ELECTRICITAS).—The electric current acts as an excitant to the nerves both of sensation and motion. It influences to some extent, also, the secretions, through its action on the nerves distributed to the secreting organs; and it affects the circulation, by inducing contractions of the heart. A powerful charge of electricity produces violent and frequently fatal effects on the central nervous system.

The various forms of electricity are resorted to for their stimulant effect in a number of nervous affections. It is chiefly useful in cases of local and functional paralysis, which are independent of lesion of the nervous centres. It has also been employed with occasional good effect in amaurosis, nervous deafness, neuralgia, chronic rheumatism, chorea, and other neuroses. From its influence on the secretions, it has been prescribed as an emmenagogue, and to promote the biliary secretion, and to heal ulcers. In the form of electro-magnetism, it is a powerful excitant in the coma resulting from narcotic poisons, and in asphyxia generally, and is probably the most active remedy that can be exhibited in these cases.

For medicinal purposes, electricity is obtained from three sources:—

1. *Friction*, as in the common electrical machine.
2. *Chemical action*, as in the voltaic battery.
3. *Magnetism*, either of temporary magnets, as in the coil machines, or of permanent magnets, as in the electro-magnetic machines.

5. MAGNETISM (MAGNETISMUS).—The employment of magnetism as a remedial resource dates more than thirteen hundred years back; and the recent discoveries of the universality of its influence over the material world have led to increased experiments with it as a therapeutic agent. The application of magnets appears occasionally to exercise considerable influence over neuralgic pains and spasmodic affections. The effects of this remedy are, however, uncertain, and it is now little used, except to detect the existence of needles and other steel substances impacted in the body.

PART III.

PHARMACOLOGICAL REMEDIES.

PHARMACOLOGICAL REMEDIES, or MEDICINES, are substances, not essentially alimentary, which, when applied to the body, alter or modify its vital functions, and are thus rendered applicable to the treatment of diseases.

The term MATERIA MEDICA is, *strictly speaking*, limited to that portion of Therapeutics devoted to the consideration of medicines. PHARMACY is the department of Materia Medica which treats of the collection, preparation, preservation, and dispensation of medicines.

To the student of medicine, the objects of examination in

relation to medicines are,—the sources from which they are derived; the mode in which they are prepared and brought to market; their sensible qualities, and also their chemical composition and relations; their physiological effects, or the effects which they are capable of producing in healthy individuals; their therapeutical effects, or those which they produce in morbid states of the system; and, lastly, the doses, modes of administration, and preparations (extemporaneous and officinal), under which they are administered.

The effects of medicines take place either in the parts to which they are applied, or in distant parts of the system. The former are termed *local* or *topical effects;* the latter, *remote effects.*

MODUS OPERANDI OF MEDICINES.

The medium through which the influence of medicines is exerted on remote parts of the body, or their *modus operandi* (as it is usually termed), has long been a contested point. On the one hand, it has been supposed that medicines and poisons transmit their impressions from the parts receiving them to distant parts, by means of a *communication through the nerves;* on the other, that the *absorption* or passage of the medicinal or poisonous molecules into the blood is necessary to their action on parts remote from the seat of impression.

Both these agencies have been adopted to explain the modus operandi of medicines. The weight of proof, however, inclines to the opinion that the *characteristic* action of medicines is transmitted to the parts influenced, exclusively through the medium of the circulation. The operation of medicines by nervous agency does not extend beyond the mere sympathy, which is always produced throughout the system by a decided impression made upon any part.

The action of medicines by absorption is proved by a variety of facts.

They are detected in many parts of the system, remote from that to which they have been applied, having been found in the blood, the solids, and the excretions, after being taken into the stomach. If the circulation be interrupted, the influence of a poison cannot be transmitted; while its effects have been obtained, when applied to a wound in the foot of an animal, after all parts of the extremity have been severed, except the artery and vein. In confirmation of the doctrine of absorption, may be cited also the admitted facts, that the remote effects of medicines or poisons are promoted or retarded by circumstances which promote or retard absorption; that the blood of poisoned animals is found to possess poisonous properties; that the fluids and solids acquire medicinal properties after the use of medicines (as the milk of nurses); that the specific effects of medicines are produced by their injection into the blood; and that medicines disappear from closed cavities into which they are introduced.

After their absorption into the blood, medicines circulate with it, penetrate through the capillaries to the various organs, and are afterwards thrown out of the system with the excretions. Some medicines produce changes in the condition of the circulating fluid. Others have a specific action upon some one or other of the organs of the body. And in passing out of the system, most medicines act as stimulants to the organs by which they are thrown out.

The absorption of medicines is effected principally by the veins, and in some degree also by the lymphatics and lacteals. The medicinal particles penetrate or soak through the interstices of the tissue with which they are placed in contact, and are thence diffused through the circulation. To a limited extent, medicinal substances probably penetrate all the tissues of the part to which they are applied, and in this way the

activity of medicines is most decided upon the organs contiguous to the seat of application.

It is objected to the theory of the operation of medicines by absorption, that certain poisons act with a rapidity incompatible with their previous introduction into the circulation. This is, however, not the fact, as the action of the most violent poisons (hydrocyanic acid, for example), is never wholly instantaneous; and careful experiments have shown that the velocity of the circulation is sufficient to diffuse a poison through the blood in a shorter space of time than its effects are ever observed on the system.

CIRCUMSTANCES WHICH MODIFY THE EFFECTS OF MEDICINES.

The circumstances which modify the effect of medicines relate both to the medicines and to the human system.

1. The properties of medicines are modified by the soil in which they grow, by climate, cultivation, age, and the season of the year at which they are gathered.

2. Medicines are more active, because more readily absorbed, in a state of solution than in a solid state.

3. Soluble medicines are often rendered inert by a chemical reaction which converts them into insolubles: in this way antidotes modify the effects of poisons.

4. Differences in dose greatly modify the effects of medicines.

5. Pharmaceutical modifications have an important influence on the efficacy of medicines. They may be exhibited in the solid, semi-solid, liquid, and aëriform states:

In the *solid* state they are administered in the shape of powders, pills, lozenges, and confections.

In the *liquid* state, they are administered in the shape of mixtures and solutions—under the head of solutions being included the officinal preparations designated as infusions,

decoctions, wines, tinctures, vinegars, syrups, honeys, and oxymels.

In the *semi-solid*, or soft state, they are applied externally, in the form of liniments, ointments, cerates, plasters, and cataplasms.

In the form of *gases* and *vapours*, medicines are used for purposes of inhalation.

SOLIDS.

POWDERS (*Pulveres*). The form of powder is usually selected for the administration of medicines, which are not very bulky, nor of very disagreeable taste, and have no corrosive property. Deliquescent substances, and such as contain a large proportion of fixed oil, should always be recently pulverized, as they are liable to spoil when kept. Other substances, employed in the form of powder, are usually pulverized on a large scale. For the purpose of pulverizing drugs in small quantity, the physician makes use of a *pestle* and *mortar*, of metal, glass, Wedgwood ware, or marble. Various means are resorted to, to facilitate the operation of powdering, and care should be taken to separate the inert portions and impurities.

The lighter powders may be administered in water or other thin liquid. The heavier powders require a more consistent vehicle, as syrup, treacle, or honey.

PILLS (*Pilulæ*), are small globular masses, of a size that can be conveniently swallowed. The form of pill is suitable for the exhibition of medicines which are not bulky, and are of disagreeable taste or smell, or insoluble in water. Deliquescent substances should not be made into pills, and those which are efflorescent should be previously deprived of their water of crystallization.

Some substances are readily made into pills, with the addi-

tion of a little water or spirit. Very soft or liquid substances require the addition of some dry inert powder, as bread-crumb or powdered gum Arabic, to reduce them to a proper consistence.

Heavy powders are mixed with some soft solid, as conserve of roses, or with a tenacious liquid, as treacle, or syrup. When the pilular mass is properly prepared, it is rolled with a spatula into a cylinder of uniform thickness, and is then divided into the required number of pills, with the hand, or more accurately, with a pill machine. The pills are rolled into spherical form between the fingers; and to prevent adhesion, are dusted with some dry powder, as powdered liquorice root or carbonate of magnesia. To conceal the taste and smell of pills, they are sometimes coated with gelatin, collodion, &c.

Troches or Lozenges (*Trochisci*), are small, dry, solid masses, made of powders with sugar and mucilage, and intended to be held in the mouth and allowed to dissolve slowly. Mucilage of *tragacanth* is usually employed in preparing lozenges.

Confections (*Confectiones*), are soft solid preparations, made with some saccharine matter. They are subdivided into *Conserves* and *Electuaries:* the former consist of combinations of recent vegetable substances and refined sugar, beat into a uniform mass; the latter are extemporaneous mixtures of medicines, usually dry powders, with syrup, honey, or treacle.

LIQUIDS.

Mixtures (*Misturæ*), are preparations of *insoluble* substances, suspended in water by means of gum, sugar, the yolk of eggs, or other viscid matter. When the suspended substance is oleaginous, the mixture is termed an *emulsion.*

Infusions (*Infusa*), are partial solutions of vegetable substances in water, obtained without the aid of ebullition. They

are made with both hot and cold water: the former extracts the soluble principle more rapidly and in larger proportion; the latter is preferred, when the active principle would be injured by heat, or when it is desirable not to take up some matter, insoluble at a low temperature. Infusions have been usually made by pouring water upon the substances to be infused, and allowing it to remain upon them for some time: when the process takes place at a heat of from 60° to 90°, it is termed *maceration;* when at a heat of from 90° to 100°, *digestion.*—Of late years, a more efficient mode of extracting the medicinal virtues of plants has been introduced, termed *percolation.* In this operation, the medicinal substance is coarsely powdered, and placed in an instrument called a *percolator,* in the lower part of which is fitted a metallic plate, like a colander. The powder is then saturated with water or other menstruum, till it will absorb no more; and, after they have remained some time in contact, fresh portions of the menstruum are added till the required quantity is employed. The fresh liquid, as it is successively added, percolates the solid particles of the medicinal substance, driving the previously saturated liquid before it; and in this way completely exhausts the substance to be dissolved.

Decoctions (*Decocta*), are partial solutions of vegetable substances in water, in which the active principles are obtained by ebullition. This is a more rapid and active mode of extracting the virtues of plants than by infusion. But it is objectionable when the proximate principles are volatile at a boiling heat, or undergo decomposition by ebullition. In making decoctions, ebullition should be continued for a few minutes only, and the liquid should be allowed to cool slowly in a close vessel. As they are apt to spoil, they should be prepared only when wanted for use.

Tinctures (*Tincturæ*), are solutions of medicinal substances in alcohol or diluted alcohol. Ammonia and ethereal spirit

are also sometimes employed as solvents; and solutions in these menstrua are called *ammoniated* tinctures and *ethereal* tinctures. Alcohol or rectified spirit (of a sp. gr. 0·835, according to the U. S. Pharmacopœia), is employed in making tinctures of substances nearly or quite insoluble in water, as the resins, essential oils, camphor, &c. Diluted alcohol or proof spirit is preferred, when the substance is soluble both in alcohol and water, or when some of its ingredients are soluble in the one menstruum and some in the other. Tinctures have been usually prepared by maceration or digestion, more commonly by the former process, and a period of two weeks is recommended for its duration. It should be conducted in well-stopped glass vessels, which should be frequently shaken. Latterly, the plan of preparing tinctures by percolation or displacement has been much followed; and it is the most thorough mode of exhausting medicinal substances, but requires considerable dexterity.

The form of tincture is adapted to the exhibition of medicines, which are to be given in small quantity, and it affords a convenient mode of graduating doses. In prescribing large and continued doses of tinctures, the stimulating effects of the alcohol which they contain must be borne in mind.

Wines (*Vina*), are solutions of medicinal substances in sherry or other white wines. They are more liable to decomposition than tinctures, but are in some cases preferred to them from the less stimulating character of the menstruum.

Vinegars (*Aceta*), are infusions or solutions of medicinal substances in vinegar or acetic acid, which is a particularly good solvent of many vegetable principles, as the organic alkalies.

Honeys (*Mellita*), are preparations of medicinal substances in honey. In *oxymels*, a combination of honey and vinegar is employed. Neither of these preparations are now much used.

Syrups (*Syrupi*), are preparations of medicinal substances in a concentrated solution of sugar. The term *syrup* (*syrupus*), or *simple syrup*, is applied to a solution of sugar (℔ijss) in water (Oj), dissolved with the aid of heat. *Medicated* syrups are usually made by incorporating sugar with vegetable infusions, decoctions, expressed juices, fermented liquors, or simple aqueous solutions. They may also be prepared by adding a tincture to simple syrup, and afterwards evaporating the alcohol; or, by mixing the tincture with sugar in coarse powder, and dissolving the impregnated sugar, after evaporation, in the necessary proportion of water. Syrups are apt to be spoiled by heat, and should be made in small quantities at a time.

By the evaporation of the solutions of vegetable principles, a very useful class of preparations termed *Extracts* (*Extracta*), is obtained. They are prepared from infusions, decoctions, and tinctures; and, sometimes, in the case of recent vegetables, from the expressed juices of plants, usually diluted with water. Extracts, prepared by the agency of water, are termed *watery extracts;* those by means of alcohol, *alcoholic extracts*. The evaporation of extracts is generally continued, till they have a pilular consistence. Within a few years, however, these preparations have been employed in the liquid form, under the name of *Fluid Extracts* (*Extracta Fluida*), which have the advantage of convenience of administration, and of being prepared at a less degree of heat. They are more liable than the solid extracts to spontaneous decomposition; and this difficulty is usually counteracted by means of sugar. In making the fluid extracts, ether is sometimes the menstruum employed, as in extracting volatile oils and resins: in other cases, diluted alcohol is resorted to. The portion of the solvent which remains after evaporation, contributes in some degree to the preservation of the preparation.

SEMI-SOLIDS.

LINIMENTS (*Linimenta*), are oily preparations designed for external use, usually thicker than water, but always liquid at the temperature of the body.

OINTMENTS (*Unguenta*), are preparations of a consistence like that of butter, made with lard or some other fatty substance. *Simple Ointment* (*Unguentum Simplex*), consists of one part of white wax and four parts of lard. Most of the ointments become rancid, when long kept, and it is therefore best to prepare them only as wanted for use.

CERATES (*Cerata*), are made of oil or lard, mixed with wax, spermaceti, or resin; with the addition of various medicinal substances. They are of harder consistence than ointments, and do not melt, when applied to the skin. *Simple Cerate* (*Ceratum Simplex*), consists of one part of white wax and two parts of lard.

PLASTERS (*Emplastra*), are adhesive at the temperature of the body, and must generally be heated to be spread. Some substances have sufficient consistence and adhesiveness to be made directly into plasters. Usually, however, medicinal substances when employed in this form, are mixed with *Lead Plaster* or *Litharge Plaster* (*Emplastrum Plumbi*), a compound of olive oil and litharge. Plasters are prepared for use by spreading them upon sheep skin, linen, or muslin, with a margin a quarter or half inch broad.

CATAPLASMS, or POULTICES (*Cataplasmata*) are soft moist substances, intended for external use. The common emollient poultice, employed to relieve inflammation and promote suppuration, is made by mixing bread-crumbs with boiling milk, or powdered flaxseed with boiling water.

GASES AND VAPOURS.

When employed in this form, medicines are administered

by *inhalation*. This may be effected either by diffusing the gas or vapour through the air to be respired by the patient; or by enclosing it in a bag or bottle with a suitable tube, through which the patient may breathe; or, when ethereal vapours are employed, by saturating a sponge or handkerchief with the ether, and applying it to the mouth and nostrils of the patient.

WEIGHTS AND MEASURES.

In prescribing and dispensing medicines, the following are the *weights* and *measures* employed in the United States, with their signs annexed.

TROY WEIGHT.

The pound, ℔	contains	Twelve ounces, ℥.
The ounce		Eight drachms, ʒ.
The drachm		Three scruples, ℈.
The scruple		Twenty grains, gr.

WINE MEASURE.

The gallon, C	contains	Eight pints, O.
The pint		Sixteen fluidounces, f℥.
The fluidounce		Eight fluidrachms, fʒ.
The fluidrachm		Sixty minims, ♏.

Liquid medicines are sometimes prescribed by *drops*, which, however, vary in quantity according to the nature of the liquid, and the shape and size of the vessel from which it is dropped. Approximate measurements are also frequently employed in prescribing the less powerful liquids: thus, a *teacup* is used for f℥iv, or a gill; a *wineglass* for f℥ij; a *tablespoon* for f℥ss; a *teaspoon* for fʒj.

A variety of circumstances, relating to the human organism, modify the effects of medicines.

Age exerts a most important influence in this particular. Children are more susceptible than adults; and, in advanced

age, also, smaller doses are required than in the prime of life. No general rule can be laid down for the adaptation of the doses of medicines to different ages, as the different susceptibilities to the influence of different medicines are unequal at the same age. Thus, infants are peculiarly alive to impression from opium, while, in the case of calomel and castor oil, they will bear much larger proportional doses.

The following table of doses for different ages is given by the Pharmacopœia of Guy's Hospital.

Age.	Maximum Dose.		
	One Ounce. ℥j.	One Drachm. ʒj.	One Scruple. ℈j.
Months.			
1	ʒss.	gr. iij.	gr. j.
3	—	iv.	—
6	℈ij.	vj.	ij.
9	—	vij.	—
Years.			
1	ʒj.	viij.	iij.
2	ʒjss.	x.	iv.
3	ʒjss.	xij.	
4*	ʒij.	xv.	v.
5	ʒijss.	xviij.	vj.
6	ʒiij.	xx.	vij.
7	ʒiijss.	xxv.	viij.
8*	ʒss.	ʒss.	℈ss.
10	ʒivss.	gr. xxxv.	gr. xij.
12	ʒv.	xl.	xiv.
13	ʒvss.	—	xv.
15	ʒvj.	xlv.	xvj.
18	ʒvjss.	—	xvij.
20	ʒvij.	l.	xviij.
21 to 45*	ʒj.	ʒj.	℈j.
50	ʒvij.	gr. l.	gr. xviij.
60 to 70	ʒvj.	xlv.	xvj.
80 to 90	ʒv.	xl.	xiv.
100*	ʒss.	ʒss.	℈ss.

Dr. Young gives the following scheme for graduating the doses of medicines to different ages: "For children under 12 years, the doses of most medicines must be diminished in the proportion of the age to the age increased by 12; thus, at two years to $\frac{1}{7}$, viz.: $\frac{2}{2+12} = \frac{1}{7}$. At 21, the full dose may be given."

Sex, temperament, and *idiosyncrasy,* all modify the effects of medicines. Women require somewhat smaller doses than men. To persons of a sanguine temperament, stimulants are to be administered with caution, while, in cases of nervous temperament, the same care is to be observed in the employment of evacuants. Idiosyncrasy renders many individuals peculiarly susceptible or insusceptible to the action of particular medicines, as mercury, opium, &c.

Habit diminishes the influences of many medicines, especially narcotics; and not a few *diseases* produce a remarkable insusceptibility to medicinal action.

The influence of *climate, occupation,* and the *imagination* upon the effects of medicines is often decided, and deserves attention in prescribing.

PARTS TO WHICH MEDICINES ARE APPLIED.

Medicines are applied to the skin, to mucous membranes, to serous membranes, to wounds, ulcers, and abscesses, and they are injected into the veins.

1. *To the Skin.*—Medicines are applied to the skin both for their local or general effects. As their influence on *distant* organs is the result of their absorption, this function is usually assisted by friction, or by removal of the cuticle, when medicines are applied to the skin to affect remote parts of the system.

The application of medicines to the skin by *friction* is occasionally resorted to, but its results are slow and uncer-

tain; and when we wish to affect the system, through the agency of the skin, the preferable method is to apply the medicine to the dermis denuded of the cuticle.

This is termed the *endermic method*, and the cuticle is usually removed by means of a blister. The medicine is applied to the denuded dermis in the form of a powder; or, if very irritating, it may be incorporated with gelatine, lard, or cerate. This method is useful in cases of irritability of the stomach, of inability to swallow, or where we desire to influence the system rapidly and by every possible avenue, or where it is of importance to apply the medicine near the seat of disease. The dose is to be two or three times the amount which is administered by the stomach.

2. *To the Mucous Membranes.*—Medicines are applied to all the gastro-pulmonary and genito-urinary mucous surfaces.

a. To the *conjunctiva*, they are applied for local effects only, and are termed *collyria*, or eye-washes.

b. To the *nasal* or *pituitary membrane*, they are applied usually for local purposes; sometimes, however, to irritate, and excite a discharge, when they are termed *errhines;* sometimes, also, to produce sneezing, with a view to the expulsion of foreign bodies from the nasal cavities, when they are termed *sternutatories.*

c. To the *mucous membrane of the mouth and throat*, medicines are applied almost exclusively for local purposes. When in solution, they are termed *gargarismata*, or *gargles.* Powders are introduced by insufflation.

d. To the *Eustachian tubes*, washes are applied in local affections.

e. On the *aërial* or *tracheo-bronchial membrane*, medicines produce a very decided influence, both local and general. Various substances are inhaled with advantage in phthisis, chronic bronchitis and laryngitis, asthma, &c., while the most powerful effects are produced on the system by the

absorption of ethereal vapours and gases through the pulmonary surface.

f. The *gastro-intestinal mucous membrane*, of all parts of the body, is most employed for the exhibition of medicines. The stomach, from its great susceptibility, its active absorbing power, and the numerous relations which it has with almost every part of the body, is the chief recipient of medicinal agents. The rectum is, however, also frequently employed for various purposes, as to relieve disease of this or of neighbouring organs, to occasion revulsion, to produce alvine evacuations, to destroy ascarides, and when for any reason it is desirable to spare the stomach.

Solid substances introduced into the rectum are termed *suppositories*. Liquids introduced into the rectum are termed *clysters*, *lavements*, *injections*, and *enemata*. Soluble substances, when thus applied, are usually dissolved in water; insoluble substances are suspended in some mucilaginous vehicle. When the enema is to be retained, it should be from one to four fluid drachms in quantity. When it is introduced to act upon the bowels, its bulk may be from twelve to sixteen fluid ounces for an adult, six to eight fluid ounces for a youth of twelve, three to four fluid ounces for a child of one to five years, and a fluid ounce for a newly-born infant. Various instruments are used for the administration of enemata, as the pipe and bladder, the ordinary syringe, the self-injecting apparatus acting by gravity, and the elastic bottle and tube. Gaseous matters have also been thrown into the rectum—tobacco-smoke, for example,—to relieve obstruction of the bowels.

g. To the *urino-genital* and *vagino-uterine membranes*, applications are made exclusively for local purposes.

3. *To Serous Membranes.* Irritating solutions are injected into the cavity of the tunica vaginalis testis, in hydrocele,

and into the hernial sac, in hernia, for the purpose of producing adhesion of the sides of the sacs.

4. To *Ulcers*, *Wounds*, and *Abscesses*, medicines are applied chiefly for their local effects. The absorbing power of these surfaces is to be kept in mind in such applications.

5. *The injection of medicines into the Veins* has been occasionally practised. The operation is, however, objectionable, from the danger of introducing air into the circulation; and it is seldom resorted to, except in the case of *transfusion of blood* after uterine hemorrhage.

THE CLASSIFICATION OF MEDICINES.

In treating of the articles of the Materia Medica, some writers have classified them according to their natural properties, others according to their action on the human system. To the student of medicine, a classification based upon the sensible qualities or natural affinities of medicines can be of little value, since it associates articles of the most opposite remedial properties. A classification of medicines founded on a similarity of action on the animal economy is more desirable and useful, and various arrangements of the Materia Medica have been attempted on this basis. They are all, to some extent, necessarily imperfect, owing partly to the diversified effects of medicines, and partly to our ignorance of the real nature of many of the modifications which they produce upon the tissues. Still, the advantages of some arrangement of this kind are so numerous, that it cannot well be dispensed with.

The following classification will be found to include the more ordinary and generally received divisions of the Materia Medica, and to present the articles in convenient groups for therapeutic application.

Medicines may be divided into—

I. Those which have a special action on the nervous system, or *Neurotics* (from νευρον, a nerve).
- Narcotics,
- Anæsthetics,
- Antispasmodics,
- Tonics,
- Astringents,
- Stimulants,
- Sedatives,
- Spastics.

II. Those which have a special action on the secretions, or *Eccritics* (from εκκρισις, secretion).
- Emetics,
- Cathartics,
- Diaphoretics,
- Diuretics,
- Blennorrhetics,
- Emmenagogues.

III. Those which modify the blood, or *Hæmatics* (from αιμα, the blood).
- Hæmatinics,
- Alteratives,
- Antacids.

IV. Those which act topically.
- Irritants,
- Demulcents,
- Anthelmintics.

CLASS I.—NEUROTICS.

ORDER I.—NARCOTICS.

Narcotics (from ναρκη, *stupor*), are medicines which impair or destroy nervous action. When administered in not immediately poisonous doses, they often produce at first a moderate degree of excitation; but this is rapidly followed by diminished activity in the functions of innervation. The different narcotics have most of them some special peculiarity of action; but they all agree in exerting a sedative or stupifying influence on the motor, sensor, and intellectual functions. Hence their therapeutic employment, to remove muscular spasm, relieve pain, allay cerebral irritability, and procure sleep.

The influence of this class of medicines upon the system is rapidly diminished by habit; and when administered for a length of time, they are to be given in gradually-increasing doses.

When employed to relieve pain, they are termed *anodynes*; when employed to procure sleep, *hypnotics* or *soporifics*.

OPIUM.

Opium (from οπιος, *juice*), is the CONCRETE JUICE of the unripe capsules of Papaver somniferum (*Nat. Ord.* Papaveraceæ). The opium poppy is a native of Persia, but is cultivated in various parts of Asia, in Europe, and in the United States. It is an annual plant, with a round, leafy stem, from two to four feet or more in height, and large four-petaled flowers. Two varieties are said to exist in a state of nature: the *black* poppy, with coloured flowers, dark seeds, and large globular capsules; and the *white* poppy, with white flowers and seeds, and ovate capsules; but these varieties run into each other under cultivation.

The CAPSULES or POPPY-HEADS are from an inch and a half to two inches or more in diameter, and, when gathered unripe, contain a good deal of opium. They are sometimes given to children in the form of *syrup*, and are applied externally as an anodyne emollient, in the form of *decoction*. The seeds are destitute of narcotic properties, and are used in Europe as an article of diet, and for the manufacture of an oil.

Opium is obtained from incisions in the half-ripe capsules. The juice, which exudes from the incisions, is scraped off after drying, generally with more or less of the epidermis, and is sometimes sent into market unmixed, as a choice variety. The opium of commerce is, however, commonly made by adding the dried juice, obtained by incision, to an extract prepared from a decoction of the leaves, the whole being kneaded together, formed into cakes, and wrapped in fresh poppy-leaves.

There are two principal varieties of opium which reach the United States,—the *Smyrna* or *Turkey* opium, and the *Egyptian*. The first, which is much the more common, comes in irregular rounded or flattened cakes, covered with the capsules of a species of Rumex. It has a waxy fracture, a strong odour, and a bitter, nauseous taste. The Egyptian opium occurs in round flattened cakes, of a more regular form than the last. It

is redder, more brittle, and has a weaker taste and smell than the Turkey opium, though occasionally samples of it are found equally rich in morphia.

A large amount of opium is cultivated in British India, for consumption in India and China, but it is not found in our markets. The Persian opium is another variety, but it does not reach the United States. Successful attempts have been made with the cultivation of the poppy in England and other parts of Europe, which have resulted in the production of an opium fully equal to the Turkey opium, and at a lower price. Very good specimens have also been made in the United States; but the great source of our supply of opium has long been, and still is, the Turkish dominions.

The best opium should have a fine chestnut colour, an aromatic, strong, peculiar smell, and a dense consistence—becoming, however, harder and darker by being kept. It should be moderately ductile, break with a deeply notched fracture, and, when drawn across white paper, should leave an interrupted stain. The taste is very bitter, and somewhat acrid, and when chewed it excites irritation in the mouth and throat. It is inflammable, and imparts its virtues to water, alcohol, and diluted acids—100 grains of the best opium yielding to cold distilled water an extract of from 35 to 45.

Chemical Constituents.—Opium contains a great variety of chemical constituents, the most important of which is the alkaloid MORPHIA, which exists in combination with an acid called *meconic*. Other principles found in opium are the alkaloids, *narcotina* and *codeia*,—narceia, meconine, paramorphia, pseudomorphia, extractive, resin, oil, &c. Morphia is the principle upon which the narcotic effects of opium essentially depend, and, with its salts, is officinal in all the pharmacopœias.

Narcotina exists in opium, chiefly in the free state, and, being insoluble in water, is left behind when the drug is

macerated in this menstruum. It occurs in white, tasteless, inodorous, needle-like crystals. At one time it was thought to possess a portion of the narcotic properties of opium, but it is now admitted to be inert in this respect. It has been used in India as an anti-periodic tonic, in the treatment of intermittent fevers.

Codeia has been found to possess some narcotic and anti-spasmodic properties, but its great expense has prevented its introduction into general use.

Incompatibles.—Alkalies, and astringent infusions containing tannic and gallic acids, are incompatible with opium.

Tests.—*T. of the chloride of iron* strikes a red colour with meconic acid; *nitric acid* colours morphia red; *ammonia* precipitates it from solution; and *tannic acid* forms with it an insoluble precipitate.

Physiological effects.—When taken in a medicinal dose, opium at first moderately excites the circulation, increases the temperature of the skin, and agreeably exhilarates the intellectual functions. The stage of excitement is, however, of short duration. The pulse soon sinks below the normal standard, susceptibility to external impressions is diminished, the faculties of the mind become confused, and consciousness is finally lost in sleep. All the secretions are diminished, except that of perspiration, which is heightened; muscular contraction is lessened; and in some persons nausea and vomiting are produced.

When a poisonous dose is taken, the stage of excitement is wanting; giddiness and stupor rapidly come on, with diminution in the frequency, though not in the fulness of the pulse; and these symptoms are soon followed by an irresistible tendency to sleep, and finally by coma. The breathing is heavy and stertorous, the pulse slow and oppressed, and the *pupils are contracted.* If relief is not afforded, the pulse sinks, the muscular system becomes relaxed, and death ensues, preceded sometimes by violent convulsions.

In cases of poisoning from opium or its preparations, the stomach should be immediately evacuated by the stomach-pump, if possible, or by emetics. The direct emetics are best for this purpose, as the sulphate of zinc (20 to 30 grains), or the sulphate of copper (5 to 10 grains). Every means should be taken to arouse the patient from his lethargy; cold affusions, counter-irritation to the nape of the neck and extremities, flagellation to the palms of the hands and soles of the feet, and, best of all, when the coma is profound, the *electro-magnetic battery*, constitute our chief resources in this emergency. Artificial inflation of the lungs is also to be practised. In an apoplectic state of the pulse, venesection has been resorted to; but the abstraction of blood favours the absorption of any portion of the poison which may remain in the stomach. Strong coffee and other mild stimuli may be used to support the system. The poisonous action of opium appears to be entirely directed to the nervous system, no local lesions being found after death.

Opium is largely used as an habitual stimulant in Oriental countries, and to some extent in Europe and the United States. The effects of indulgence in this species of intoxication are of the most destructive character upon both the physical and mental faculties.

Medicinal Uses.—Of all the articles of the Materia Medica, opium enjoys the widest range of therapeutic application. From its properties of assuaging pain and inducing sleep, it is useful in almost all diseases; and it is positively contra-indicated only where there is a tendency to apoplexy or coma, or where there exists an idiosyncrasy with respect to its effects. As an *anodyne* in painful malignant ulcers and severe injuries, we have no substitute for opium; and, as an *hypnotic* in mania-a-potu, and in the wakefulness and cerebral irritability of fever, it is equally invaluable. From its power of relaxing muscular spasm, it is our most efficient resource in

tetanus, colic, and spasm of the stomach, bowels, biliary ducts, ureters, neck of the bladder, &c. In dysentery and cholera it forms the basis of every variety of treatment, partly for its diaphoretic effects, but principally for its action in arresting both the secretions and peristaltic motion of the bowels. In pulmonary and gastric irritability, colica pictonum, peritonitis, rheumatism, gout, typhus, gangrene, &c., opium is also constantly employed.

Administration.—The ordinary dose of opium as an anodyne and hypnotic is one grain. Much larger doses are, however, called for in many diseases; and, when it is administered for a length of time, the dose must be gradually increased. To infants it is to be given with the greatest caution.

Opium is administered in the form of *powder* or *pill*. It is easily powdered when thoroughly dried, and the pills should always be made from the powder. The powder is sometimes used endermically, and is also sprinkled on irritable ulcers. In the form of *suppositories* it is also applied to the rectum.

The following are the officinal preparations of opium:

Tinctura Opii (*Laudanum*). Prepared by macerating powdered opium ʒijss, in diluted alcohol Oij. When long kept, particularly if exposed to the air, it becomes thick from evaporation of the alcohol, and its strength is much increased. Dose: ♏xiij, or 25 drops, equivalent to a grain of opium. There are 120 drops in fʒj. Laudanum is much used in the form of enema.

Tinctura Opii Camphorata (*Camphorated Tincture of Opium*). *Paregoric Elixir.* Prepared by macerating opium ʒj, in diluted alcohol Oij, with benzoic acid, oil of anise, clarified honey, and camphor. Dose, ʒss, or a tablespoonful, containing rather less than a grain of opium. A favourite

preparation for children. 5 to 20 drops may be given to an infant.

TINCTURA OPII ACETATA (*Acetated Tincture of Opium*). Prepared by macerating opium, ℥ij, in vinegar f℥xij, and alcohol Oss. Dose, ♏x, or 20 drops.

ACETUM OPII (*Vinegar of Opium*). *Black Drop.* Prepared by saturating diluted acetic acid with opium, mixed with nutmeg, saffron, and sugar. Dose, 7 to 10 drops.

VINUM OPII (*Wine of Opium*). *Sydenham's Laudanum.* Prepared by macerating opium ℥ij, in sherry wine Oj, with cinnamon and cloves. Dose, the same as that of laudanum.

EXTRACTUM OPII (*Extract of Opium*). Made by evaporating the aqueous solution. Dose, gr. ¼.

CONFECTIO OPII (*Confection of Opium*). Opium beaten up with honey and spices. Dose, grs. xxxvj.

EMPLASTRUM OPII (*Opium Plaster*). Made by mixing opium with Burgundy pitch and lead plaster.

PULVIS IPECACUANHÆ ET OPII (*Powder of Ipecacuanha and Opium*). This powder, well known under the name of *Dover's Powder*, is made by rubbing up one drachm of opium and ipecacuanha each, with eight drachms of sulphate of potassa; the salt being employed to promote the minute division and thorough intermingling of the opium and ipecacuanha. Dover's powder is a most valuable anodyne diaphoretic, extensively prescribed in diarrhœa, dysentery, rheumatism, &c. Dose, gr. x, containing gr. i of opium and ipecacuanha each.

MORPHIA AND ITS PREPARATIONS.—Morphia exists in opium in combination with meconic acid. The meconate of morphia is separated from the other constituents of the drug by successive macerations in water; alcohol and solution of ammonia are then added to the watery solution, by which the salt is decomposed, the ammonia precipitating the mor-

phia, and the alcohol seizing the colouring matter as soon as it is separated from the alkali. The crystals of morphia, which are formed, are afterwards boiled in alcohol, and the solution is filtered through animal charcoal.

Morphia occurs in colourless crystals, which are inflammable and dissipated by heat. It is scarcely soluble in water or ether, but is soluble in boiling alcohol. Nitric acid turns it red and then yellow. Sol. sesquichloride of iron renders it blue. From its *insolubility* it is not employed medicinally, except in combination with acids.

MORPHIÆ SULPHAS (*Sulphate of Morphia*), MORPHIÆ ACETAS (*Acetate of Morphia*), MORPHIÆ MURIAS (*Muriate of Morphia*), are the officinal salts of morphia, made by saturating the alkali with sulphuric, acetic, and muriatic acids. They are all freely soluble in water, and produce analogous medicinal effects, the sulphate being, however, most employed in this country. The salts of morphia possess the anodyne, hypnotic, antispasmodic, and diaphoretic properties of opium, and are considered less apt to produce headache and nausea, possibly owing to the absence of narcotina. They are peculiarly adapted to the *endermic* method of application. Dose, one-sixth of a grain. A *solution of the sulphate of morphia* is officinal, and is much prescribed (*Liquor Morphiæ Sulphatis*). It contains one grain to f℥j of water. Dose, f℥j–ij.

LACTUCARIUM.

Lactucarium is the INSPISSATED JUICE of Lactuca sativa, the Garden Lettuce (*Nat. Ord.* Asteraceæ), and is obtained from incisions in the plant, before the flower-stem shoots. Another and inferior mode of procuring it is by expression and evaporation of the expressed juice. It is found in the shops in roundish, hard masses, of a brown colour, with an opiate smell, and a bitter, unpleasant taste. The active principle is termed *lactucin*.

Effects and Uses.—Lactucarium possesses the *anodyne* and

hypnotic qualities of opium, with a slight sedative action on the circulation, and, it is said, some diuretic properties. It may be given where opium disagrees from idiosyncrasy in the patient. Dose, gr. x.

BELLADONNA.

Atropa Belladonna, or Deadly Nightshade (*Nat. Ord.* Solanaceæ), is a European perennial plant, with herbaceous, branched, downy stems, about three or four feet high, large ovate leaves of a dull-green colour, and drooping, bell-shaped, purple flowers. The whole plant possesses narcotic properties, but the LEAVES only are officinal. When fresh, they have an unpleasant smell, and a bitterish, subacrid taste; when dried they retain this taste, but have scarcely any odour.

The narcotic properties of belladonna depend on the presence of an alkaloid termed *atropia*, which is found in all parts of the plant. It is a white, crystalline, odourless substance, with a bitter, acrid taste, soluble in alcohol, and partially soluble in water. It is a most energetic poison, producing analogous effects to those of belladonna, but much more powerful. Latterly, atropia has been a good deal employed medicinally as a substitute for belladonna, on account of its greater certainty. The dose for internal use is from one-thirtieth to one-sixth of a grain, in solution. As a collyrium, to *dilate the pupil*, a solution of a grain in an ounce of water, may be employed, and a few drops of the solution applied to the eye. A tincture (atropia gr. i, alcohol f℥j, distilled water f℥vij), is used for the same purpose. And a muriate of atropia and an ointment are also recommended.

Physiological Effects of Belladonna.—In small doses the effects of belladonna are those of an anodyne narcotic, with little or no action on the circulation, or on any of the secretions, except a peculiar dryness of the mouth and throat. In larger doses it causes *dilatation of the pupils*, loss of vision, giddiness, constriction of the throat, difficulty of deglutition and articu-

lation, nausea, with occasionally vomiting and purging, and sometimes a red eruption. When excessive doses are taken, these symptoms are aggravated, and terminate in delirium, coma, syncope, and death, often preceded by convulsions. Dissections show that the action of the poison is not confined to the cerebro-spinal system, but that it is attended by inflammation of the digestive organs. Cases of poisoning from belladonna are to be treated like those from opium. Vegetable acids have been found useful.—Applied to the eyebrow, belladonna causes dilatation of the pupil.

Medicinal Uses.—Belladonna is one of our most highly esteemed anodyne and antispasmodic remedies. In the treatment of neuralgia it ranks at the head of the narcotics, and is extensively employed both alone and in combination with the sulphate of quinia; it should be given until dryness of the throat, dilatation of the pupil, and some disorder of vision are produced. Its powers of allaying spasm have been found very efficacious in the treatment of hooping cough. As a discutient of cancerous indurations, it has enjoyed some reputation, but any good effects in these cases have probably been owing to an anodyne and not a resolvent influence. In mania, and many diseases of the cerebro-spinal system, it has been occasionally employed with advantage. As a preventive of scarlatina, the use of belladonna has been proposed on homœopathic principles, from its producing an affection of the throat and scarlet rash on the skin; there appear to be no grounds, however, for attributing to it any such prophylactic virtue.

As a topical remedy, belladonna is employed principally *to produce dilatation of the pupil,* in operations for cataract, iritis, and prolapsus iridis. It is applied in the form of extract or ointment to the eyebrow, temple, or conjunctiva, and produces dilatation in a few minutes. The topical application of belladonna has been suggested in France,

to relieve rigidity of the os uteri in labour; but the practice has not found favour in Great Britain or the United States.

Administration.—The dose of the *powder* is gr. i, to be repeated and increased, till dryness of the throat, dilatation of the pupil, and dimness of vision, are produced. It is most frequently exhibited in the form of *extract* (or inspissated juice). Dose ¼ to ½ a grain, to be repeated and increased. The *tincture* (℥iv to diluted alcohol Oij) and the *alcoholic extract* are also officinal. For external use, a plaster (*Emplastrum Belladonnæ*), made with the extract and resin plaster, and an ointment (*Unguentum Belladonnæ*), are employed.

STRAMONIUM.

Stramonii Folia, Stramonium Leaves; Stramonii Radix, Stramonium Root; Stramonii Semen, Stramonium Seed.

Fig. 1.

Datura Stramonium, or Thorn Apple, sometimes called Jamestown weed (*Nat. Ord.* Solanaceæ), is an annual in-

digenous plant, which grows very abundantly in waste grounds, in all parts of the world. It has a forked, branching stem, from three to six feet high, ovate, toothed leaves, large funnel-shaped white or purplish flowers, which appear in mid-summer, and ovate capsules, filled with numerous kidney-shaped, brownish-black seeds. The odour of the plant is strong and disagreeable, and its taste bitter and nauseous. It loses these properties very much when dried, but the process does not appear to weaken its narcotic qualities. The LEAVES, SEEDS, and ROOT are all officinal, but the seeds are most powerful, from containing most daturia.

The active principle of Stramonium is an alkaloid termed *daturia*, which possesses properties analogous to those of atropia.

The *physiological effects* of stramonium are closely allied to those of belladonna, with a more marked action on the secretions. From its common occurrence in every part of the country, cases of poisoning from this weed are very frequent, particularly with children, who are fond of swallowing the seeds. The treatment laid down for the relief of poisoning from belladonna is applicable to these cases.

The *medicinal uses* of stramonium are similar to those of belladonna. It is prescribed internally in neuralgia, rheumatism, mania, and epilepsy; and in spasmodic asthma the leaves have been smoked, with great relief. The practice is, however, dangerous in aged or apoplectic persons. Topically, stramonium is used by oculists to *dilate the pupils* and diminish the sensibility of the retina to light; and it is an excellent anodyne application, in the form of cataplasm and ointment, to inflammatory tumours, irritable ulcers, bed sores, and hæmorrhoids.

Administration.—The dose of the *powdered leaves* is gr. ij; of the *seeds* half a grain; to be repeated, and gradually increased, till narcotic effects are produced. Dose of the *extract*

of the leaves (an inspissated juice), gr. i, to commence with; of the *extract of the seeds* (alcoholic), gr. ½. The *tincture* (℥iv to diluted alcohol Oij), and the *ointment*, made by boiling the fresh leaves in lard, are also officinal.

HYOSCYAMUS—HENBANE.

Hyoscyami Folia, Henbane Leaves; Hyoscyami Semen, Henbane Seed.

Fig. 2.

Hyoscyamus niger, or Henbane (*Nat. Ord.* Solanaceæ), is a native of Europe, and is naturalized in the northern parts of the United States. It grows to the height of about two feet, with large, sinuated, pale-green leaves, and flowers of a

straw-yellow colour. The whole plant has narcotic properties; but the LEAVES and SEEDS only are officinal. Henbane should be gathered when in flower; and, when fresh, has a strong, offensive narcotic odour, and a mucilaginous, unpleasant, slightly acrid taste; but it loses most of these qualities in drying. The seeds are of a yellowish-gray colour, with something of the odour of the plant, and have an oleaginous, bitter, taste. The active properties of the plant depend upon a peculiar alkaloid principle, termed *hyoscyamia*, nearly identical in its action with atropia, but more soluble in water.

Effects and Uses.—Henbane, in small doses, produces the anodyne, soporific, and antispasmodic effects of opium, without, however, affecting the secretions. In large doses, it causes *dilatation of the pupil*, delirium, loss of vision, &c. It is used as a substitute for opium, and has the advantage of not constipating the bowels; but its effects are not very uniform or powerful. Externally, it is employed in the form of cataplasm or fomentation to painful swellings and ulcers; and it may be used to dilate the pupil, in the same manner as belladonna.

Dose of the powdered leaves, gr. iij to gr. x; but they are rarely used. The *extract* (an inspissated juice) is the preferable form of administration; it is of a dark olive colour, and extremely variable quality. Dose, gr. v to ℈j. *Tincture* (℥iv to diluted alcohol Oij), dose f℥j. An *alcoholic extract* is also officinal.

TABACUM—TOBACCO.

Nicotiana Tabacum, or Virginian tobacco (*Nat. Ord.* Solanaceæ), is a native of the warm countries of America, but is now extensively cultivated in most parts of the world. It is an annual plant, growing to the height of from three to six feet, with large, oblong, pointed, hairy, pale-green leaves, and light-greenish, funnel-shaped flowers. The DRIED LEAVES

are the portion used. They have a yellowish-brown colour, a strong, peculiar, narcotic odour, and a bitter, nauseous taste. The darker coloured leaves are the strongest.

The virtues of tobacco are imparted to alcohol and water, and depend on the presence of an alkaloid called *nicotina*, which is found in all parts of the plant. It is a colourless liquid, with an acrid odour, and an acrid, burning taste, and is a most energetic poison. From the dried leaves is also obtained a concrete volatile oil, termed *nicotianin*, and an *empyreumatic oil*, which gives the peculiar smell to old tobacco pipes. Both of these principles are poisonous.

Physiological Effects.—On persons unaccustomed to its use, tobacco, in small doses, produces a slight sedative action, with nausea, swimming in the head, increased flow from the kidneys, and sometimes, also, from the bowels. In larger doses, it induces vomiting and purging, a sensation of sinking at the pit of the stomach, giddiness, disorder of vision, depression of the circulation, great relaxation of the muscular system, coldness of the surface, and other symptoms of prostration; and, when excessive doses have been taken, these symptoms become more violent, and are followed by convulsions, paralysis, coma, and death. Cases of poisoning are to be treated on the principles applicable to other cases of narcotic poisoning;—the diffusible stimuli are to be freely given.

The habitual use of tobacco as an exhilarant is well known. When taken to excess, it frequently develops disorders of the stomach, heart, and nervous system.

Medicinal Uses.—Tobacco is employed in medicine, chiefly with a view to its action on the muscular system—its anodyne and hypnotic properties being relatively feeble. In various spasmodic diseases, particularly in colic, ileus, strangulated hernia, constipation from spasmodic constriction, tetanus, spasm of the neck of the bladder and the glottis, and asthma,

it is a remedy of great value. It is to be employed, however, with caution, as it occasionally acts with dangerous energy.

Administration.—Tobacco is not given by the stomach, owing to its emetic properties. It is usually applied to the rectum, in the form of *infusion* (℥j—Oj of boiling water, one-third to be given at a dose). It may also be smoked, or applied locally in the form of cataplasm. An *ointment* (*Unguentum tabaci*), made by boiling the fresh leaves in lard, is a useful application to indolent ulcers and some cutaneous affections, particularly tinea capitis. The *oil* (*Oleum tabaci*), is sometimes mixed with ointments.

LOBELIA.

Lobelia inflata, or Indian tobacco (*Nat. Ord.* Lobeliaceæ), is a very common indigenous plant, growing to the height of from six inches to two feet, with a biennial root, an erect, hairy stem, ovate, serrated leaves, pale-blue flowers, and ovoid, inflated capsules. It flowers from July till the appearance of frost, and should be gathered about August and September. All parts of it are active, but the LEAVES and CAPSULES are most so. It has an unpleasant smell, and an acrid, burning, nauseous taste, which is at first faint, but soon becomes excessive. *Cold* water and alcohol extract the virtues of lobelia, which contains a volatile alkaloid principle, *lobelina*, analogous to nicotina.

Physiological Effects.—Lobelia produces effects on the system resembling those of tobacco, acting in small doses as a sedative, nauseant, diuretic, and diaphoretic; in larger doses as an energetic emetic; and in still larger doses as an active acro-narcotic poison. It was employed by the aborigines, and has always been a popular empirical remedy.

Medicinal Uses.—Lobelia is sometimes classed among

emetics, but its action in this particular is too violent for its safe administration. It is chiefly employed, by regular prac-

Fig. 3.

titioners, with a view to its antispasmodic properties, for the relief of asthma, and is given in small doses, gradually in-

creased, until headache or nausea ensue. It may also be used as an enema, to fulfil the same indications as tobacco.

Administration.—Lobelia is given in substance, tincture, and infusion. The dose of the *powder* as an antispasmodic, is gr. i to gr. iij; as an emetic, gr. x to gr. xx. The best form, particularly in asthma, is the *tincture* (℥iv to diluted alcohol Oij), which may be given in the quantity of f℥j, to be repeated as occasion may require.

CONIUM—HEMLOCK.

Conii Folia, Hemlock Leaves; Conii Semen, Hemlock Seed.

Fig. 4.

Conium maculatum, or Hemlock (*Nat. Ord.* Apiaceæ), is a biennial European plant, naturalized in many parts of the

United States. Its stem is erect, from three to five feet high, round, smooth, and often spotted with purple. The leaves are large, bright-green, and repeatedly compound; the flowers are small, white, and arranged in umbels, appearing in June and July. The whole plant is narcotic and virulent, and has a fetid, heavy odour. The LEAVES and SEEDS are the portions used in medicine. The leaves should be gathered when the plant has done flowering, and kept in vessels from which the air and light are excluded. Plants growing in sunny situations and warm climates are most active. When well preserved, the dried leaves have a fine green colour, and the characteristic smell and bitterish taste of the fresh herb, though less powerfully. The seeds have a yellowish-gray colour, a slight smell, and a bitter, rather nauseous taste.

The active principle of hemlock is a peculiar alkaloid termed *conia*, which exists in larger proportion in the seeds than the leaves. It is a colourless oily fluid, sparingly soluble in water, and more so in alcohol; and is a highly energetic poison even in very small doses.

Physiological Effects.—The action of hemlock in medicinal doses is purely narcotic, without either sedative or stimulant influence. In large doses, it causes nausea, vertigo, dimness of vision, relaxation of the muscles; and in poisonous quantities, dilatation of the pupils, difficulty of speech, delirium or coma, paralysis, and finally convulsions and death. It appears to have little or no hypnotic effect.

Medicinal Uses.—It is employed chiefly as a general and topical anodyne, to relieve the pain of malignant tumours; and, though probably destitute of the deobstruent powers which have been ascribed to it, exerts a remarkable palliative influence upon painful chronic indurations. It has been also recommended as an antispasmodic in hooping-cough, asthma, and even tetanus; and it is used externally as a cataplasm to cancerous and other irritable ulcers. Conium is the *cicuta* of

Hippocrates, Galen, and Pliny, and is supposed to have been the poison administered to Socrates and Phocion.

Administration.—The officinal preparations of this medicine are the powder, tincture, and extract. The dose of the *powdered leaves* is gr. iii. to gr. iv, twice a day, to be rapidly increased till vertigo or nausea ensue. The *extract* (inspissated juice) may be given in the same doses; it is an uncertain preparation, and should be rejected unless it have a strong and penetrating odour. A *tincture* (℥iv to diluted alcohol Oij, dose f℥ss, f℥j), and an *alcoholic extract*, are also used.

ACONITUM—ACONITE.

Aconiti Folia, Aconite Leaves; Aconiti Radix, Aconite Root.

Aconitum Napellus, Aconite, Wolfsbane, or Monkshood (*Nat. Ord.* Ranunculaceæ), is a native of the mountainous parts of Europe. It has a fusiform root, a simple erect stem, growing usually to the height of from two to four feet, palmate, deeply cleft leaves, and large dark violet-blue flowers. The LEAVES and ROOT are both used, but the root is the more powerful. They have little or no smell; but their taste is bitterish and acrid, and when chewed they occasion a peculiar feeling of tingling and numbness, in the tongue and interior of the mouth. These properties are impaired by long keeping, and the plant loses its medicinal efficacy. Other species of aconite possess similar poisonous qualities to those of the A. Napellus. The active principle of aconite is an alkaloid named *aconitia*, which is officinal.

Physiological Effects.—Taken in small doses, aconite produces a sensation of numbness in the head, face, and extremities, with a sedative action on the circulation, and more or less nausea and muscular debility. In larger doses, its effects are those of an acro-narcotic poison; gastric irritation, coma, contraction of the pupils, convulsions, and death.

Medicinal Uses.—Aconite is a powerful and valuable remedy in the treatment of neuralgia, chronic rheumatism, and other painful diseases, as might be inferred from its *benumbing* effects on the system. From its sedative influence on the circulation, its employment has been suggested to reduce inflammatory action, and as a remedy in hypertrophy of the heart. It is, however, an uncertain and occasionally a very violent agent; and its exhibition in doses large enough for an antiphlogistic influence is hardly free from danger. As a *topical* anodyne, in neuralgia, it has no superior.

Administration.—The dose of the *powder* is gr. i to gr. ij; of the *extract* (an inspissated juice of the fresh leaves), gr. ½ to gr. i; of the *alcoholic extract*, gr. ½ to gr. i; of the *tincture* of the leaves (℥iv to diluted alcohol Oij), 20 to 30 drops; of the *tincture* of the root (℔ i to alcohol Oij), 8 to 10 drops. These doses are to be repeated twice or thrice daily, and cautiously increased, till the effects of the medicine are apparent. The tincture of the root and alcoholic extract are thought to be the most reliable preparations. The tincture and alcoholic extract may be used externally.

ACONITIA is prepared from an aqueous solution of the alcoholic extract of aconite root, by the addition of sulphuric acid (which converts the natural salt of aconitia into a sulphate), and by subsequent precipitation of the alkaloid with ammonia, animal charcoal being employed in the process as a decolorizing agent. It is white, with a tinge of yellow, without smell, of a bitter acrid taste, and produces in the mouth a sense of numbness. It is partially soluble in water, and is readily dissolved by alcohol and ether.

Aconitia is an exceedingly virulent poison, more powerful when pure than hydrocyanic acid. It is scarcely adapted to internal use, as even one-fiftieth of a grain has produced alarming results. As a topical agent in neuralgia and rheumatism, it has been employed with great success in alcoholic

solution (gr. i–ij to f3j), or as an ointment (gr. ij to lard ℥j, rubbed up with alcohol gtt. vi).

EXTRACTUM CANNABIS—EXTRACT OF HEMP.

"An ALCOHOLIC EXTRACT of the dried tops of Cannabis sativa—variety Indica," has been introduced into the Materia Medica in the last edition of the U. S. Pharmacopœia. Cannabis sativa, or Hemp (*Nat. Ord.* Cannabinaceæ) is a native of Persia and the northern parts of India, and is cultivated in Europe and in the United States. Narcotic virtues appear to exist only in the Cannabis Indica, or Indian variety of the plant, although there is no difference in the botanical characters of the several varieties.

Effects and Uses.—The medicinal properties of Cannabis Indica are narcotic and antispasmodic, and in India both the herb and resin are extensively used as intoxicating exhilarants. In large doses it is sedative, producing relaxation of the muscles, heavy sleep, and abatement of pain, without much affecting the secretions; but opinions are by no means settled in the United States and Great Britain as to its effects. It has been chiefly extolled as an antispasmodic in traumatic tetanus, and has been employed with success in other spasmodic diseases, chorea, hysteria, &c., and as an anodyne in rheumatism, gout, neuralgia, &c. It has also been given with advantage as an hypnotic in mania-a-potu; and its powers of exciting uterine contractions, and of checking uterine hemorrhagic discharges, are highly spoken of. Dose, gr. ij–v.

HUMULUS—HOPS.

Hops are the STROBILES of Humulus lupulus, or Hop-vine (*Nat. Ord.* Cannabinaceæ), a climbing vine, indigenous in Europe, and probably also in North America, with serrated,

rough leaves, and greenish-yellow flowers. The medicinal portion is the fruit, or STROBILES, which are also largely employed in the preparation of malt liquors, and are known as *hops*. They consist of thin, somewhat translucent, veined, leaf-like bracts or scales, of a greenish-yellow colour, a strong, fragrant, narcotic odour, and a bitter, aromatic, slightly astringent taste. Near their base are two small, round, dark seeds, covered with aromatic glands or grains, which are the active portion of the hops, and are termed *Lupulin*. They are separated by threshing, rubbing, and sifting the scales, and constitute about a sixth part of their weight.

LUPULIN is officinal, and consists of rounded or reniform, rather transparent grains, of a cellular texture, and a golden-yellow colour. It is composed of a volatile oil, a bitter principle termed *lupulite*, resin, and other matters. The scaly bracts contain a small portion of lupulinic matter.

Effects and Uses.—Hops are narcotic and tonic. The narcotic properties probably reside in the volatile oil, and the tonic properties in the bitter principle. They are said, also, to possess anaphrodisiac properties, and sometimes prove diuretic. The odorous emanation is employed as an hypnotic by means of the hop-pillow. Internally, they are given to relieve restlessness, induce sleep, and allay pain, and are also much employed for their stomachic and tonic effect. The combination of tonic and narcotic virtues renders hops an excellent remedy in mild forms of mania-a-potu. Topically, they are employed in the form of fomentation or poultice, as a resolvent or discutient, in painful swellings and tumours.

Administration.—Hops are given in the form of *infusion* (℥ss to boiling water Oj), and *tincture* (℥v to alcohol Oij), dose, f℥j to f℥iij.

The best preparation for internal use is LUPULIN, in the dose of gr. v to gr. xij, in powder or pills. The *tincture of*

lupulin (ʒiv to alcohol Oij) may be given in the dose of fʒj to fʒij.

DULCAMARA—BITTERSWEET.

The STALKS of Solanum Dulcamara, the Woody Nightshade, or Bittersweet (*Nat. Ord.* Solanaceæ), a European vine, naturalized in the United States, possess combined narcotic and diaphoretic properties. They are of a greenish-gray colour, about the thickness of a quill, and have, when fresh, an unpleasant odour, which they lose by drying. Their taste is at first bitter, afterwards slightly acrid and sweet. The active principle is a poisonous alkaloid termed *solania*, which has been found also in Solanum tuberosum, or common potato, and S. nigrum, or black nightshade.

Effects and Uses.—In small doses, the most obvious effects of bittersweet are an increase in the secretions from the skin and mucous surfaces, with some diminution of sensibility. In excessive doses it is an acro-narcotic poison. It is principally used in the form of decoction (ʒj to water Ojss), in painful cutaneous affections, and also in chronic catarrh, rheumatism, and gout.

ACIDUM HYDROCYANICUM DILUTUM—DILUTED HYDROCYANIC ACID.

Hydrocyanic acid, known also as cyanhydric acid, and *prussic* acid, is found in a variety of vegetable substances, as the bitter almond, peach kernels and leaves, wild cherry, cherry laurel, &c. It is employed in medicine only in a state of extreme dilution; and the diluted acid is obtained by the action of sulphuric acid and water on the ferrocyanuret of potassium, or, when wanted for immediate use, by the action of muriatic acid and water on cyanuret of silver.

Diluted hydrocyanic acid is a colourless, volatilizable liquid, with a peculiar odour, and a cooling, somewhat irritating taste. It undergoes decomposition if exposed to the light,

and should be kept in bottles covered with black paint or paper. It contains two per cent. of the anhydrous or concentrated acid.

The anhydrous acid is a colourless, transparent, very volatile and decomposible liquid, with a powerful, peculiar odour, and a cooling, afterwards burning taste. Both water and alcohol dissolve it readily. It consists of one eq. of cyanogen and one of hydrogen. Its presence in a suspected mixture may be detected by the addition of a solution of nitrate of silver, which throws down a white, curdy precipitate of cyanuret of silver, distinguishable by its exhaling the peculiar odour of prussic acid on the addition of muriatic acid.

Physiological Effects.—When taken in medicinal doses, gradually increased, hydrocyanic acid occasions a bitter taste, increased flow of saliva, irritation in the throat, nausea, headache, giddiness, faintness, disorder of the vision, and tendency to sleep. The pulse is sometimes accelerated, but more commonly depressed. In a poisonous dose, hydrocyanic acid arrests life with fearful rapidity, and is one of the most energetic poisons known, one or two drops of the pure acid being sufficient to destroy a dog in a few seconds. When not immediately fatal, it produces great and sudden prostration, trismus, difficult and spasmodic respiration, dilatation and immobility and sometimes contraction of the pupils, convulsions, &c. The best *antidotes* are ammonia and its carbonate, chlorine, and a mixture of sulphate of iron (gr. x to water f℥j), tincture of chloride of iron (f℥j), and carbonate of potassa (℈j), in water (f℥i or ij).

Medicinal Uses.—Hydrocyanic acid is a valuable narcotic agent in allaying spasm, pain, and nervous irritability in a variety of disorders, and is much used to relieve cough, particularly in phthisis pulmonalis, and for its antispasmodic virtues in asthma and hooping-cough. It is also a most effi-

cacious remedy in gastrodynia, and in neuralgic affections of the bowels, and also in chronic vomiting. Topically, it is employed as an anodyne in neuralgia, and in various forms of cutaneous diseases (℥j to water Oi–Ojss).

Dose of the officinal acid, one or two drops, to be repeated and gradually increased by a drop, till some effect is perceptible. When it is taken for a length of time, care should be observed to have the medicine, as renewed, of uniform strength; and it is best, in using a fresh sample, to return to the minimum dose.

POTASSII CYANURETUM—CYANURET OF POTASSIUM—Is used as a substitute for hydrocyanic acid, and has the advantage of being a more uniform chemical product, and less liable to undergo decomposition. It occurs in white, opaque, amorphous masses, having a sharp, somewhat alkaline and bitter-almond taste, and its solution yields the odour of hydrocyanic acid, when exposed to the air. It is very soluble in water, and sparingly so in alcohol. Its medicinal and poisonous effects are the same as those of hydrocyanic acid. Dose, gr. $\frac{1}{8}$ in half an ounce of distilled water, to be repeated and increased. The addition of a few drops of some vegetable acid frees the hydrocyanic acid, and the same effect is produced by the acids of the stomach.

OLEUM AMYGDALÆ AMARÆ—OIL OF BITTER ALMONDS—Contains hydrocyanic acid, and may be used for the same purposes. It is obtained by distillation from the fruit of Amygdalus communis, variety *Amara* (*Nat. Ord.* Drupaceæ), and is of a yellowish colour, with a bitter, acrid, burning taste, and the peculiar odour of the bitter almond, which is different from that of hydrocyanic acid. It is heavier than water, slightly soluble in it, and soluble in alcohol and ether. Its effects upon the system are closely analogous to those of

hydrocyanic acid, and its strength is about four times that of the diluted officinal acid. Dose, for internal use, a quarter to half a drop, in emulsion; as an external application, one drop to a fluidounce of menstruum.

SYRUPUS AMYGDALÆ, SYRUP OF ALMONDS, made from both the sweet and bitter almonds, is slightly impregnated with the virtues of hydrocyanic acid, and is a pleasant vehicle for cough mixtures.

CAMPHORA—CAMPHOR.

Camphor is a peculiar CONCRETE SUBSTANCE, derived from Camphora officinarum, or the Camphor Laurel (*Nat. Ord.* Lauraceæ), a large evergreen tree of China, Japan, and Cochin-China. All parts of the tree are strongly impregnated with camphor, which is obtained from the roots and branches by sublimation. In this state it is known in commerce as *crude camphor*, and consists of dirty grayish grains, adhering in crumbling masses. The crude camphor, as imported from Canton, is not found in the shops, until it is refined by re-sublimation with lime, when it is termed *refined camphor*.

This occurs in large hemispherical or convex-concave cakes, perforated in the middle. It is solid at ordinary temperatures, soft, and somewhat tough, but may be readily powdered by the addition of a few drops of alcohol. It is translucent, has a strong, fragrant odour, and an aromatic, bitter, afterwards cooling taste. It is volatile, highly inflammable, lighter than water, and very slightly soluble in it, but soluble in alcohol, ether, oils, and acids. Water, added to the tincture, precipitates the camphor.

A valuable camphor is known in the East, which is found in a concrete state in the cavities and fissures of the trunk of Dryobalanops Camphora, a tree of Borneo and Sumatra. The Borneo camphor occurs in small fragments of crystals, which are transparent, brittle, and harder than the laurel camphor.

An oil, or liquid camphor, is also obtained from the Dryobalanops, which is more highly esteemed in Oriental countries than the camphor itself.

Camphor is composed of carbon, hydrogen, and oxygen ($C_{10}H_8O_1$). It has been considered to be an oxide of a hypothetical base called *camphogen* or *camphene*, which is isomeric with the oil of turpentine. When heated, it yields an oil, called *oil of camphor*. By passing hydrochloric acid into oil of turpentine, a substance is obtained called *artificial camphor*.

Physiological Effects.—The topical action of camphor is irritant. After its absorption, its effects, in small doses, are moderately stimulant, exhilarant, and anodyne, with a determination to the skin. In large doses, it causes considerable disorder of the cerebro-spinal system, and generally depression of the circulation; and in excessive quantity, it acts as a powerful acro-narcotic poison, occasioning burning heat in the stomach, violent convulsions, and maniacal delirium. It is also an anaphrodisiac. In cases of poisoning, after evacuating the stomach, opium, wine, &c., are to be administered.

Medicinal Uses.—From its combined narcotic and diaphoretic powers, camphor is a valuable remedy in the treatment of dysentery, and is much employed in this disease, either in combination with opium, or as a substitute for the latter. In the early stages of cholera, and in flatulent diarrhœa, it is also greatly prescribed. As a diaphoretic stimulant and antispasmodic, it is useful in the low stages of fever and in typhoid conditions of the system generally. In many forms of mental disorder, it calms irritability, relieves despondency, and induces sleep. And it has no superior among the anodynes, in allaying irritation or pain of the genito-urinary organs, as in dysmenorrhœa, uterine after-pains, strangury, nymphomania, chordee, &c. From its anodyne and sudorific properties, it is also applicable to the treatment of chronic rheumatism and gout. *Externally*, camphor is employed as an anodyne in

rheumatism, and as a discutient in chronic inflammatory affections.

Administration.—The medium dose, in substance, is gr. v to gr. x; but it may vary from gr. j to ℈j. It is best given in emulsion, made by rubbing up the camphor with loaf sugar, gum arabic, myrrh, and water. The form of pill is objectionable, from the difficulty with which it is dissolved in the gastric liquors.

Aqua Camphoræ, Camphor Water, is made by rubbing up camphor with a few drops of alcohol, and subsequently with the carbonate of magnesia and water. The carbonate is used to promote the solution of the camphor, and is afterwards separated by filtration. Dose, f℥j (containing about gr. iij) to f℥ij or iij. The *tincture,* popularly known as spirits of camphor (℥iv to alcohol Oij), is chiefly used as an embrocation, but it may be given internally, where the stimulus of the alcohol is not objectionable, in the dose of gtt. v to f℥j.

Linimentum Camphoræ, Camphor Liniment, consists of camphor (℥ss), dissolved in olive oil (f℥ij): a mild embrocation.

Tinctura Saponis Camphorata, Camphorated Tincture of Soap, or *Soap Liniment,* is made by mixing soap and camphor with oil of rosemary, in alcohol and water. It is a yellow, oleaginous liquid, and is used as an anodyne and gently rubefacient application, in gouty and rheumatic pains, sprains, bruises, &c.

Linimentum Saponis Camphoratum, Camphorated Soap Liniment, or *Opodeldoc,* is made like soap liniment, with the addition of oil of origanum, except that common soap, obtained from animal fat, is employed instead of Castile soap. This gives it a soft-solid consistence, which liquefies with the heat of the body.

ORDER II.—ÆTHEREAL ANÆSTHETICS.

The term, Anæsthetics (from *α*, *non*, and *αἴσθησις*, *sensation*), properly speaking, includes all agents which diminish sensibility and relieve pain. It has, however, been used to denominate a class of ethereal remedies, which are applied by inhalation, and produce such a condition of temporary insensibility, as to prevent pain during surgical operations and parturition.

The vapours usually employed as anæsthetics, are those of SULPHURIC ETHER and CHLOROFORM. Protoxide of nitrogen, and the vapours of chlorohydric and nitric ethers, of chlorinated chlorohydric ether, of bisulphuret of carbon, of chloride of olefiant gas, of benzin, aldehyde, and light coal tar naphtha, are said to produce similar effects, but they are not in use.

ÆTHER—ETHER.

Sulphuric ether is prepared by the distillation of alcohol and sulphuric acid, and is afterwards rectified by redistillation with solution of potassa. It is considered by chemists to be an oxide of ethyle; alcohol, which has the same composition, with the addition of an equivalent of water, being termed the hydrated oxide of ethyle. By the action of sulphuric acid, with heat, alcohol is deprived of this equivalent of water, and is converted into ether.

Ether is a transparent, colourless liquid, with a strong, fragrant odour, and a hot, pungent taste. It wholly evaporates in the air, so rapidly as to cause a considerable degree of cold, is very inflammable, combines with alcohol in every proportion, and dissolves in ten times its volume of water. Its sp. gr. for medicinal purposes, should not exceed 0·750.

Effects and Uses when Swallowed.—When taken into the stomach, ether produces a combined stimulant and narcotic effect, the stage of excitement being, however, very tran-

sient. It has long been employed as an antispasmodic and anodyne remedy in asthma, angina pectoris, hysteria, cramp of the stomach and bowels, spasm of the gall-ducts, &c.; and from its combined stimulant and antispasmodic virtues, it has been found useful in the latter stages of typhus, attended by subsultus tendinum, &c. As a topical anodyne, ether is a very good application in nervous headache and earache; and from its refrigerant effects, it has been used in the reduction of strangulated herniæ, and as a cooling lotion in cerebral affections. If evaporation be repressed, when it is applied locally, it acts as a rubefacient, and may be employed for counter-irritation.

Dose, f℥ss to f℥j, to be increased when habitually used. It may be incorporated with water, by rubbing it up with spermaceti, in the proportion of two grains to a drachm of ether.

Effects and Uses when Inhaled.—When the vapour of ether is absorbed into the system through the pulmonary surface, the nervous functions are successively and progressively affected. The mental faculties and volition become first impaired; insensibility and unconsciousness rapidly supervene, *during which susceptibility to pain is lost;* and if the inhalation of the ether be excessive, the respiration may be paralysed, and death may result. In the beginning of etherization, the circulation is accelerated, but it is afterwards depressed. The period of intoxication lasts from five to ten minutes, and the patient ordinarily recovers without serious inconvenience; although headache, nausea, drowsiness, and languor sometimes ensue for a few hours. During the stage of insensibility, convulsive twitches or muscular rigidity are occasionally noticed; the breathing is sometimes stertorous; the iris becomes fixed; and the orbicularis palpebrarum does not contract when touched. Insensibility to pain in some cases takes place before unconsciousness; and when patients are recovering

from the latter state, the mental faculties are often completely restored, while insensibility to pain continues.

Within the last five years, the inhalation of ether has been practised very generally in all parts of the world, with the greatest success, for the prevention of pain in surgical operations; and its use has been subsequently extended with the happiest results to the relief of pain in labour.

It should not be exhibited where disease of the heart or brain, or serious obstruction of the lungs exists, or when from any cause there is unusual tendency to syncope, and precaution should be taken to guard against asphyxia; but when administered with proper care and discrimination, it is attended with little or no danger or unpleasant results of any kind.

The quantity of ether necessary to effect etherization is about two ounces; and it may be conveniently applied by means of a soft sponge or handkerchief. The sponge is usually adjusted in shape to the projection of the nose, and after being soaked in warm water, and squeezed dry, is saturated with pure ether. It is then applied to the nostrils, the mouth being left free to receive atmospheric air; and if irritability of the air-passages occur, this is to be gradually overcome. From three to five minutes are required to produce anæsthezation, and its occurrence is known by closure of the eyelids (if they have been previously open), failure to respond to questions, and muscular relaxation. The sponge is then to be removed, and may be reapplied from time to time if necessary.

Etherization has been also resorted to in a variety of morbid conditions, in which the administration of narcotics and antispasmodics has been found useful. It exerts a powerful control over the violent types of spasmodic disease, and has been prescribed with the greatest advantage in hysteria, tetanus, asthma, chorea, convulsions, hooping-cough, dysmenor-

rhœa, and almost every description of spasm; and as a relaxant in the reduction of dislocations.

CHLOROFORMUM—CHLOROFORM.

Chloroform is obtained from the distillation of alcohol with chlorinated lime, and is, in chemical language, a hydrated terchloride of formyle. It is a colourless, volatile liquid, of a bland ethereal odour, and a hot, aromatic, saccharine taste. It is not inflammable, is slightly soluble in water, and freely soluble in alcohol and ether. Sp. gr. 1·49.

Chloroform is apt to contain oily impurities, upon which some of its injurious effects are thought to depend. As a test of its purity, agitation with colourless sulphuric acid is recommended, when the acid will become brown or yellow if the chloroform be impure, but will receive no colour from it if pure.

Physiological Effects.—The effects of chloroform on the system are analogous to those of ether, but much more rapid and powerful. It is, however, destitute of the excitant properties of ether, and acts as a sedative narcotic. When inhaled, in the dose of a fluid drachm or more, it rapidly induces coma, with great relaxation of the muscles, and the most complete insensibility to painful agents. The period at which insensibility occurs varies from fifteen seconds to two minutes; and it continues usually between five and ten minutes, and may be prolonged considerably, by renewals of the inhalation. The patient usually recovers without recollection of what has occurred during the state of insensibility, and with few or no uncomfortable sequelæ.

The administration of chloroform has, in some cases, been attended with fatal syncope. This has ordinarily occurred with such rapidity as to render remedial interference unavailing; but, at the slightest approach of symptoms of the kind,

the patient should be placed in a recumbent position, cold affusions should be applied, and, above all, electro-magnetism should be resorted to. It would be proper always to have an electro-magnetic machine ready for use, when chloroform is inhaled.

Medicinal Uses.—Chloroform is prescribed by the stomach, as an anodyne and antispasmodic, in all the cases to which ether is applicable, and has the advantage of a more agreeable taste. It has been found particularly useful to relieve the pain and vomiting of cancer of the stomach. It has been also extolled as an antiperiodic in the treatment of intermittent fevers. Externally, it is used as a topical anodyne, and also as a stimulating application to foul and indolent ulcers, and occasionally for its constitutional effects.

Dose, from one to four drops to f℥j, in sweetened water or mucilage; to be repeated. As an anti-neuralgic liniment, f℥j to f℥ij of camphor liniment; or as a rubefacient and anodyne, undiluted, on linen, covered with oiled silk, to prevent evaporation. As a wash or gargle, f℥j or ij to water Oj.

The introduction of chloroform, as an anæsthetic, took place shortly after that of ether; and, from its greater intensity of action, its freedom from irritating effects on the bronchial mucous membrane, and its more agreeable odour, it has been extensively used, particularly in Great Britain, to the exclusion of ether. A number of fatal cases have, however, occurred from the inhalation of this agent, where its administration did not appear in any way counter-indicated; and it can scarcely be considered a perfectly safe remedy. It is employed as an anæsthetic, anodyne, and antispasmodic, to fulfil the indications to which ether is applicable. In parturition, it is probably less dangerous than in the operations of surgery, owing to the counteracting influence of the pains of labour upon the nervous system; and no fatal case is recorded from its employment in this department.

The *dose* for inhalation is a fluid drachm, to be repeated in two minutes, if anæsthesia be not produced; and its effects may be renewed from time to time, without injury. It may be applied on a handkerchief, held near the nose or mouth, care being taken to allow a proper admixture of atmospheric air.

A solution of chloroform in ether has been used in the United States, without any unfavourable results, the depressing effects of the chloroform being weakened or counteracted by the stimulating properties of the ether. One part of chloroform may be combined with four parts of ether.

Under the name of CHLORIC ETHER, a solution of one part of chloroform in two parts of absolute alcohol, is employed as an anæsthetic, and is regarded by many practitioners as safer than chloroform, and more agreeable than sulphuric ether. The ethereal solution is, however, generally preferred.

ORDER III.—ANTISPASMODICS.

Antispasmodics are medicines that allay irregular nervous action. Their effects upon the economy in a state of health are not very decided, and are limited to a slight stimulation of the circulation and exhilaration of the mental faculties. Their influence is, however, strikingly shown in certain deranged conditions of the nervous system, particularly in those forms of spasm which depend upon idiopathic or primary nervous disorder. They are also useful in many varieties of mental disturbance, as wakefulness, hypochondriasis, and even insanity, and are often preferable to narcotics in the treatment of these cases, from their comparative freedom of action on the brain.

ASSAFŒTIDA—ASSAFETIDA.

Assafetida is the CONCRETE JUICE of the ROOT of Narthex

Assafœtida (*Nat. Ord.* Apiaceæ). This plant is a native of Persia, and has a large, tapering root, the size of a man's leg, with long, lanceolate leaves, springing directly from the root, and an erect stem, from six to nine feet in height, rising from the midst of the leaves. The drug is obtained from incisions made into the root, or by taking successive slices of it. The exuded juice is scraped off, hardened in the sun, and afterwards packed for exportation. It occurs in masses of various size, consistence, and colour, but is usually whitish, intermixed with darker spots, and becomes reddish, and finally brown, by exposure to the air. It is sometimes soft and adhesive, at other times hard and brittle, and is not readily powdered, except at a low temperature. It breaks with a waxy lustre, and the best samples appear to be composed of irregularly-shaped tears. Its taste is unpleasant, bitter, and acrid—its odour powerful, alliaceous, and fetid.

Assafetida is a gum-resin, united to a volatile oil. The gum is dissolved by water; and the mucilage thus formed suspends the resin and volatile oil. The resin and volatile oil are soluble in alcohol; but the tincture becomes milky on the addition of water, owing to the separation of the resin.

Physiological Effects.—Assafetida is a moderate excitant and exhilarant, and exerts a marked influence upon morbid conditions of the nervous system. It also stimulates the mucous secretions generally, and increases the peristaltic action of the bowels. Its volatile oil is absorbed, and the odorous principle is recognised in the secretions, especially in the perspiration.

Medicinal Uses.—No medicine is more highly esteemed as a direct antispasmodic than assafetida. It is much resorted to in the various forms of hysteria, and is particularly valuable in relieving the mental depression which constitutes one of the protean types of this disorder. In other spasmodic diseases, as chorea, asthma, hooping-cough, &c., it is a favourite

remedy with many practitioners; and, from its combined expectorant and antispasmodic properties, it is particularly adapted to spasmodic pectoral affections. In certain diseases of the abdominal viscera, as flatulent colic and costiveness, assafetida is often useful as an antispasmodic and laxative enema. It is also prescribed as a stimulating emmenagogue, when the uterine disorder is attended with a disturbance of the nervous functions.

Notwithstanding its disagreeable odour, this drug is largely used as a condiment in Asia; and even in the refined cookery of Europe its flavour is admired. Many persons take it habitually for its exhilarant effects; and, when used as a medicine, it generally becomes acceptable.

Administration.—Dose, gr. v to ℈j, in pill. It is most frequently given in the form of *mixture* (Mistura Assafœtidæ, —℥ij, rubbed gradually with water Oss),—dose f℥ss to f℥j, repeated; or as an enema, f℥ij to f℥iv. This mixture, from its whiteness and opacity, is sometimes called *lac assafœtidæ*, or *milk of assafetida*. The *tincture* (℥iv to alcohol Oij—dose f℥j), is a good preparation, where the alcohol is not objectionable. A *plaster* is used externally.

GALBANUM.

Galbanum is the CONCRETE JUICE of an unknown Eastern plant. It is met with in the form of tears, or more commonly in lumps, of a brownish colour, and has a peculiar balsamic odour, and a hot, bitter, acrid taste. It is a gum-resin united to a volatile oil. Its effects are similar to those of assafœtida, but less active; and it is chiefly employed externally, as a stimulant and resolvent to indolent swellings. It forms the basis of the *compound galbanum plaster*.

AMMONIACUM—AMMONIAC.

This is the CONCRETE JUICE of Dorema Ammoniacum (*Nat.*

Ord. Apiaceæ), a plant of Persia. It comes in tears or lumps, of an irregular shape, yellowish on the outside, whitish within, is moderately hard and brittle, and has an unpleasant, bitter, and rather acrid taste, with a peculiar smell, somewhat like that of galbanum. It is a gum-resin, with a little volatile oil. Its effects are similar to those of assafœtida; but it is seldom used, except as an antispasmodic expectorant in chronic catarrh. Dose, gr. x to xxx. A *mixture* and *plaster* are officinal.

VALERIANA—VALERIAN.

Valeriana officinalis, or Wild Valerian (*Nat. Ord.* Valerianaceæ), is a perennial European plant, growing to the height of three or four feet, with serrated leaves, and small, reddish-white flowers. The ROOT is the portion used, and consists of numerous long, slender, cylindrical fibres, attached to a rough, tuberculated head. The colour of the dried root externally is yellowish or brown, and internally white; when powdered, it is yellowish-gray. It has a peculiar, powerful odour, of which cats are fond, and a bitterish, subacrid, aromatic taste. Water and alcohol extract its virtues, which depend on the presence of a *volatile oil*, from which a peculiar colourless volatile acid, called *valerianic*, may be separated.

Effects and Uses.—Valerian generally acts as an energetic excitant and antispasmodic, although at times it makes but a feeble impression on the system. It is much used as a nervous excitant and antispasmodic in the various forms of hysteria, and occasionally, also, in epilepsy, chorea, hemicrania, hypochondriasis, delirium tremens, &c.

Dose of the *powder*, from ʒss to ʒjss, three or four times a day; of the *infusion* (ʒss to Oj of boiling water), fʒj to ij; of the *tincture* (ʒiv to alcohol Oij), fʒj; of the *ammoniated tincture* (ʒiv to aromatic spirit of ammonia Oij—an excellent preparation), fʒj to ij; of the *fluid extract*, fʒj; of the *oil*, 4 or 5 drops.

DRACONTIUM—SKUNK CABBAGE.

Dracontium fœtidum—Symplocarpus fœtidus,—or Skunk Cabbage (*Nat. Ord.* Orontiaceæ), is an indigenous plant, growing in moist situations, which flowers in April and May, and afterwards sends up numerous large and luxuriant leaves. The fresh root has a strong, fetid odour, and an acrid taste, but loses its properties by being kept. It is stimulant, antispasmodic, and narcotic, and is employed in hysteria, asthma, chronic catarrh, &c. Dose, gr. x to xx, gradually increased. It is also given in the form of *infusion*. The leaves are used in the country to keep up the discharge from blistered surfaces, and to stimulate indolent ulcers.

The well-known articles TEA and COFFEE (THEA and COFFEA), possess antispasmodic and exhilarant properties.

MOSCHUS—MUSK.

Musk is a peculiar CONCRETE SUBSTANCE obtained from Moschus moschiferus, or the Musk Deer, an animal rather larger than the goat, and resembling the deer in its characters, which inhabits the mountainous portions of Central Asia. The musk-bag is found only in the male, and lies between the umbilicus and prepuce. It is an oval pod, about two and a half inches long, and one and a half broad, flat on one side, and convex and hairy on the other, and in the full-grown animal contains from ʒjss to ʒvi, of a liquid secretion, which, when dried, is musk. Two kinds are known in commerce, the China and the Russia Musk, the former of which is much the stronger.

Musk occurs in grains or lumps concreted together, of a reddish-brown colour, and has usually some hairs of the pod mixed with it. It has a powerful diffusive, aromatic odour, and a bitterish taste. It is inflammable, leaving a light

spongy charcoal. On analysis, it yields ammonia and a variety of other constituents, but the odorous principle has not been isolated. It is partially soluble in water and alcohol, and completely so in ether.

Owing to its high price, musk is greatly sophisticated. Sometimes artificial pods are met with, which may be distinguished from the genuine, by the absence of the remains of the penis and of an aperture in the middle of the hairy coat. The musk itself is more frequently adulterated, by mixture with dried blood, and a variety of substances. Indeed, little if any genuine musk is found in the shops.

Effects and Uses.—Musk is a powerful excitant and antispasmodic, without much effect on the cerebral functions. If a pure article could be obtained, it would have no superior as a direct antispasmodic in the treatment of essential nervous disorders—hysteria, epilepsy, chorea, and hiccough, and as a combined excitant and antispasmodic in the latter stages of typhus. But it is now little prescribed, owing to the difficulty of procuring it good.

Administration.—It may be given in the form of bolus or emulsion. Dose, gr. x, to be repeated every two or three hours.

An article, termed ARTIFICIAL MUSK, is made by the addition of one part of rectified oil of amber to three parts of nitric acid. It resembles musk both in sensible and medicinal properties, and has been prescribed in its stead, in the same dose.

CASTOREUM—CASTOR.

This is a peculiar CONCRETE SUBSTANCE, found in membranous follicles, which exist between the anus and external genitals of the Castor fiber, or Beaver. It occurs in the form of solid unctuous masses, contained in pairs of sacs about two inches in length, of a brownish-black colour externally,

and of a reddish-brown colour internally. It has a peculiar, penetrating, disagreeable smell, and a bitter, acrid, nauseous taste. It is soluble in alcohol and ether.

Effects and Uses.—Castor is moderately excitant and antispasmodic, and is very analogous in its effects to musk. It is not much used. Dose of the substance, gr. x to gr. xx; of the *tincture* (ʒij to alcohol Oij), fʒj to fʒij.

OLEUM SUCCINI RECTIFICATUM—RECTIFIED OIL OF AMBER.

Amber, Succinum, is a sort of fossil resin found in various parts of the world, and comes to this country from the shores of the Baltic. It is a hard, brittle substance, usually translucent, and of a pale golden-yellow colour, insipid, and inodorous, except when heated. By distillation, it yields an *oil* which, when rectified, is employed medicinally. The oil is nearly colourless at first, but gradually becomes brown, has a strong, peculiar odour, and a pungent, acrid taste. It is soluble in alcohol. An acid called *succinic* is also obtained from amber.

Effects and Uses.—Oil of amber is excitant and antispasmodic, and has been used in hysteria, epilepsy, tetanus, pertussis, and amenorrhea. It is chiefly employed as an external application, and is a good remedy in pertussis, and convulsions of children. Dose of the oil, gtt. v to gtt. xv. For external use, it may be mixed with three or four parts of olive oil and brandy, with one part of laudanum added.

ÆTHER—ETHER, has been already considered under the head of *anæsthetics;* but, from its powerful control over idiopathic nervous disorders, it is often ranked with antispasmodics, and affords an illustration of the undefinable gradation which exists between these two classes of medicines. The following preparations of ether are officinal.

OLEUM ÆTHEREUM—ETHEREAL OIL.

This is a result of the distillation of alcohol with a large excess of sulphuric ether. It is a volatile liquid, of a yellowish colour and peculiar odour; very sparingly soluble in water, but readily dissolved by alcohol or ether. It has antispasmodic properties, but is used in medicine only as an ingredient of the compound spirit of ether.

SPIRITUS ÆTHERIS COMPOSITUS—COMPOUND SPIRIT OF ETHER.

This preparation, known as *Hoffman's Anodyne Liquor*, is a solution of ethereal oil (f℥ij), in ether (Oss), and alcohol (Oj). It is a volatile liquid, with a burning, slightly sweetish taste, and the peculiar odour of ethereal oil.

Effects and Uses.—Hoffman's Anodyne has the antispasmodic and excitant properties of ether, and from the alcohol present, is a more permanent stimulant. It is much used in hysteria, and is often added to laudanum, to prevent the nausea which the latter sometimes excites. Dose, f℥j to f℥ij, in sweetened water.

ORDER IV.—TONICS.

Tonics, called also corroborants, are medicines which produce a gradual and permanent increase of nervous vigour. It is only, however, in certain conditions of disease that they manifest this invigorating influence; as, in a state of health they often act as irritants, stimulants, or even nauseants. Their local effects are similar to their general effects. They exalt the nervous functions of the parts to which they are applied, and increase their firmness and density. When taken into the stomach they produce a two-fold corroborant effect, improving the digestive powers by their local action, and strengthening the system generally by their cerebro-spinal influence.

Tonics differ from stimulants in the more permanent cha-

racter of their effects: "tonics give strength, stimulants call it forth." The more powerful tonics are closely allied to the narcotics in their action, producing, in over-doses, giddiness, loss of sight and of hearing, convulsions, delirium, and even death. And this analogy is farther illustrated by the curative powers of tonics in the relief of painful and spasmodic diseases, as neuralgia, rheumatism, chorea, and epilepsy.

The articles of this class may be divided into *vegetable* and *mineral* tonics. The vegetable tonics are characterized by *bitterness;* and it is said that they owe their bitterness and medicinal activity to a principle which has been termed bitter extractive. It is doubtful, however, whether any such proximate principle has really been obtained. The mineral tonics unite astringent with tonic properties; and the preparations of iron produce a further corroborant effect, by increasing the red colouring matter of the blood.

The therapeutic application of tonics comprises a diversified range of diseases. They are employed as stomachics in dyspepsia, and as general corroborants in convalescence from acute diseases, in chronic affections accompanied by marasmus and cachexia, and in typhus and gangrene. But their most striking and valuable powers are shown in their febrifuge influence upon malarious diseases. The modus medendi here is obscure, but the curative agency is undoubtedly due to a powerful impression upon the central organs of the nervous system. The anti-neuralgic and antispasmodic properties of tonics have already been alluded to. They also enjoy considerable reputation in the treatment of chronic bowel-complaints, where they act by restoring tone to the debilitated intestinal tube; and on the other hand, they are often useful as laxatives in torpid conditions of the alimentary canal.

VEGETABLE TONICS.

The vegetable tonics may be arranged into three sections,

viz.: 1. The pure bitters. 2. The aromatic bitters, which contain a stimulant volatile oil, and are aromatic as well as tonic. 3. The astringent bitters, which contain tannic and gallic acids, and are both astringent and tonic: this group contains cinchona, the most powerful and important of the vegetable tonics. The bitter principle is found also in many medicines belonging to other classes, as rhubarb, aloes, taraxacum, &c., and gives them tonic properties.

SIMPLE BITTERS.

QUASSIA.

Quassia is the WOOD of Simaruba excelsa (*Nat. Ord.* Simarubaceæ), a lofty tree of Jamaica and other West Indian islands. It is imported from the West Indies in billets of various size, which are found in the shops in the form of chips or raspings. Externally, it is covered with a smooth, brittle bark; the wood is white, but becomes yellowish by exposure. It has no odour, but an intense permanently bitter taste. Water and alcohol extract its virtues, which are said to depend on a neutral principle termed *Quassin*.

The article originally known as Quassia, was the root and wood of Quassia amara, a shrub of Surinam, but it does not now reach our markets. It is thought to have possessed much more decided tonic properties than the drug now found in commerce.

Effects and Uses.—Quassia is a mild tonic, free from stimulant or astringent effects, and is employed principally in dyspepsia, want of appetite, and other stomachic affections. It is much used to give additional bitterness to malt liquors. Dose, in *powder* ℈j to ʒj, three or four times a day; but the best form of administration is that of *infusion* (ʒij to water Oj), in doses of f ʒjss to f ʒiij. An *extract* is given in the dose of gr. v, but it is principally used as an excipient for the ad-

ministration of the mineral tonics. Of the *tincture* (ʒij to alcohol Oij), the dose is fʒj to fʒij.

SIMARUBA.

Simaruba is the BARK of the ROOT of Simaruba officinalis (*Nat. Ord.* Simarubaceæ), a tall tree of Jamaica and many parts of South America. It occurs in long pieces of various size, which are much rolled or quilled, of a brownish-yellow colour externally, and yellow internally. It contains a bitter principle, analogous to quassin, and resembles quassia in its medicinal effects.

COPTIS—GOLDTHREAD.

Fig. 5.

Coptis trifolia, or Goldthread (*Nat. Ord.* Ranunculaceæ), is a small, evergreen, herbaceous plant, resembling the strawberry-vine, with perennial creeping roots, slender stems,

round, ternate leaves, and a single small white flower, which appears through the spring till midsummer. It belongs to the northern regions of America and Asia, and abounds in swampy places in Canada and New England. The parts used are the ROOTS, which should be gathered in autumn, and carefully dried. They are of a bright-golden colour, and give the name by which the plant is commonly known.

Effects and Uses.—Goldthread is a pure and powerful bitter, similar in its effects to quassia, but much more palatable, and is a very good stomachic tonic. It is also employed in New England as a topical application in aphthous and other ulcerations of the mouth. It is usually given in the form of *tincture* (ʒj to alcohol Oj), in the dose of fʒj, and of *infusion* (ʒss to water Oj).

GENTIANA—GENTIAN.

Gentian is the ROOT of Gentiana lutea, or Yellow Gentian (*Nat. Ord.* Gentianaceæ), a perennial plant of the mountainous parts of Central and Southern Europe, growing to the height of two or three feet, with broad, ovate, opposite leaves, and handsome whorled, yellow flowers. It is imported in cylindrical branched pieces, of various size, marked by transverse annular wrinkles and longitudinal furrows. Externally, it is yellowish-brown, internally, brownish-yellow, and of a spongy texture. Its odour in the fresh state is peculiar and disagreeable, but when dried feeble; its taste is intensely bitter. Water and alcohol extract its virtues. It contains a peculiar oil and acid, pectin, sugar, and a bitter principle, termed *gentianin*. Other species of gentian are employed as substitutes for the yellow gentian.

Effects and Uses.—Gentian is a pure bitter, without either astringency or much aroma. In full doses, it is more disposed to relax the bowels than the other simple bitters; and like others of the vegetable tonics, in excessive doses it is

capable of producing narcotic effects. It is an admirable stomachic in dyspepsia and gastric disorders, and is also used in the various forms of constitutional debility.

Administration.—In the form of *powder*, the dose is gr. x to ʒss. But it is usually given in the form of *infusion* (ʒss to water fʒxij, with diluted alcohol fʒiv, and orange-peel and coriander, each ʒj); *tincture* (Tinctura Gentianæ composita, gentian ʒij, orange-peel ʒj, cardamom ʒss, to diluted alcohol Oij), in the dose of fʒj to fʒij; and *extract*, in the dose of gr. x to ʒss.

SABBATIA—AMERICAN CENTAURY.

Fig. 6.

Sabbatia angularis, American Centaury, or Centaury (*Nat.*

Ord. Gentianaceæ), is a very common annual indigenous plant, with an erect stem, one or two feet high, opposite ovate leaves, and numerous terminal flowers of a rich rose-colour, nearly white in the centre. It is found in low meadow-grounds or neglected fields in most parts of the United States, and flowers in August and September. The WHOLE HERB is officinal, and should be gathered while in flower. It has a very bitter taste, and yields its virtues to both water and alcohol.

Effects and Uses.—Centaury is a pure bitter, with no astringency, and very little aroma. It is an excellent stomachic, and may be used also as a general corroborant. It is said to act as an emmenagogue when given in warm infusion, and, like the bitters generally, has had anthelmintic properties ascribed to it. The best form of exhibiting it is *infusion* (℥j, to boiling water Oj), of which the dose is a wineglassful when cool; of the *powder* ʒss to ʒj may be given.

COLOMBA — COLUMBO.

Columbo is the ROOT of Cocculus palmatus (*Nat. Ord.* Menispermaceæ), a climbing plant of Mozambique, where it is known under the name of *Calumb.* The root consists of fleshy tubers, with numerous offsets, which are the portions used, the main root being too fibrous. They are sliced, strung on cords, and dried in the sun; and are found in the shops in round pieces about a quarter of an inch thick, externally of a brown, wrinkled appearance, and internally yellow. The odour is slightly aromatic, and the taste very bitter. Owing to the starch which is found in columbo, it is liable to be worm-eaten. It contains, besides a large proportion of starch, a peculiar azotized substance, and two bitter principles, *colombin* and *berberin*, the latter of which is found also in Berberis vulgaris (*Barberry*). Water and alcohol take up its

virtues; and from its liability to attract moisture from the air, it should not be kept in the form of powder.

Effects and Uses.—Columbo is a very agreeable demulcent tonic, particularly acceptable to the stomach, and hence well adapted to the convalescent stages of acute disorders of the bowels and of fevers. It is also a good preparation in the sickness of pregnant women, and is one of the best of the stomachics in all cases where there is unusual delicacy of the stomach. In its native country, it is much employed in the treatment of dysentery.

Administration.—The dose of the *powder* is gr. x to gr. xxx. It is best given in the form of *infusion* (ʒss to boiling water Oj, dose, fʒj to fʒij), which should be used at once, as it is liable to spoil. Of the *tincture* (ʒiv to diluted alcohol Oij), fʒi to fʒiv may be given. Columbo is often combined with aromatics, iron, and alkalies, and is sometimes added to purgative mixtures.

AROMATIC BITTERS.

SERPENTARIA—VIRGINIA SNAKEROOT.

The ROOTS of several species of Aristolochia are known under the name of Virginia Snakeroot. The most familiar is A. Serpentaria (*Nat. Ord.* Aristolochiaceæ), an herbaceous indigenous plant, with a perennial root, composed of numerous slender fibres, arising from a knotty, brown head, one or more stems, eight or ten inches in height, heart-shaped, pointed, yellowish-green leaves, and purple, tubular flowers, springing up close to the root. It grows in shady woods and on hill-sides, flowering in May and June; but, from the great demand for the roots, it has become scarce.

Virginia Snakeroot is found in the shops, in tufts of long, slender, matted fibres, attached to a knotty, rugged head. They are brittle, and of a yellowish-brown colour. The odour is

Fig. 7.

aromatic and agreeable; the taste somewhat pungent, bitter, and aromatic. Water and alcohol extract its virtues, which depend on the presence of a volatile oil and a bitter principle. The roots of A. reticulata are very commonly substituted for those of A. Serpentaria, from which they differ only in the larger size of their fibres. They are quite equal to the latter, and are even thought to contain a larger proportion of volatile oil.

Effects and Uses.—Virginia snakeroot is a combined stimulant and tonic, with diuretic or diaphoretic properties, according to the mode of its administration. It is much used in the latter stages of fevers, and in other acute diseases, and is frequently combined with Peruvian bark, in the treatment of intermittents. The proper form of administration is that of *infusion* (ʒss to boiling water Oj), in doses of fʒj to fʒij, repeated. Of the *tincture* (ʒiij to diluted alcohol Oij), the dose is fʒj to fʒij. *Huxham's Tincture of Bark* contains Virginia snakeroot.

ANTHEMIS—CHAMOMILE.

Anthemis nobilis, or Chamomile (*Nat. Ord.* Asteraceæ), is a small, herbaceous, trailing European plant, cultivated extensively both in Europe and this country. The FLOWERS are the officinal portion. They consist of small spheroids, with convex, yellow disks, and numerous white, spreading rays. By cultivation they become double; but in Europe the single flowers are preferred, as the active properties reside in the disks, which are larger in the single-flowered wild plants. Chamomile flowers have a bitter, aromatic taste, and a strong, peculiar odour, both of which are imparted to water and alcohol. They contain a volatile oil, bitter extractive, and a little tannic acid.

Effects and Uses.—Chamomile, in small doses, is a mild, agreeable aromatic tonic, and, in large doses, acts as an emetic. The cold infusion is much employed as a stomachic, and the hot infusion is given to aid the operation of emetics. The flowers, boiled in warm water, form a good fomentation to inflamed parts. The usual form of administration is the *infusion* (ʒss to water Oj). Dose, as a stomachic, fʒij, two or three times a day, cold; as an emetic, hot, ad libitum.

COTULA—MAYWEED.—Anthemis cotula, Wild Chamomile, or Mayweed (*Nat. Ord.* Asteraceæ), an herbaceous plant, in-

digenous in Europe, but extensively naturalized in the United States, resembles chamomile very closely, both in botanical characters and properties, and is used as a substitute for it in domestic practice.

EUPATORIUM—THOROUGHWORT.

Fig. 8.

Eupatorium perfoliatum, Boneset, or Thoroughwort (*Nat. Ord.* Asteraceæ), is a very common indigenous plant, growing in wet grounds in every part of the United States. It has a perennial root, with numerous herbaceous stems, from two to five feet high, long, narrow leaves, perforated by the stems, and numerous white FLOWERS, which form a flattened

summit to the plant. These appear in August, continuing in bloom till October, and, with the LEAVES, are the officinal portion. They have a faint odour, a strongly bitter taste, are soluble in water or alcohol, and contain a peculiar bitter principle, gum, tannic acid, resin, salts, and other matters.

Effects and Uses.—Thoroughwort is a stimulant tonic, diaphoretic, and expectorant, and in large doses proves emetic and laxative. It is a good stomachic in dyspepsia, and, from its combined corroborant, expectorant, and diaphoretic properties, is an excellent remedy in the latter stages of pneumonia and bronchitis. It is also used with good effect in rheumatism, and in remittent and typhoid fevers. It should be given in *infusion* (℥j to boiling water Oj), f℥ij of which may be taken cold, as a stomachic, three or four times a day, and in freer warm draughts, as a diaphoretic.

ABSINTHIUM—WORMWOOD.

The TOPS and LEAVES of Artemisia Absinthium, or Wormwood (*Nat. Ord.* Asteraceæ), a European plant, naturalized in New England, are ranked among the aromatic bitters, but are not now much employed. They may be given in *infusion* (℥j to boiling water Oj).

MAGNOLIA.

The BARK of Magnolia glauca, Magnolia acuminata, and Magnolia tripelata (*Nat. Ord.* Magnoliaceæ), indigenous trees, remarkable for the beauty of their foliage, and the size and fragrance of their flowers, is officinal, and ranks with the aromatic bitters. The bark of the trunk, branches, and root, is alike officinal; but that of the last is the most active. It contains a volatile oil, a green resin, and a peculiar crystallizable bitter principle. The aromatic property is impaired by drying, and is lost when the bark is long kept.

It is used as a gentle stimulant tonic, and diaphoretic, in

the low stages of fever, rheumatism, &c. An *infusion* may be given, but the best solvent is diluted *alcohol*.

LIRIODENDRON—TULIP-TREE BARK.

The BARK of Liriodendron tulipifera, the Tulip-Tree, or American Poplar (*Nat. Ord.* Magnoliaceæ), the well-known pride of the American forest, remarkable for its size, foliage, and beautiful tulip-shaped flowers, closely resembles that of magnolia in its medicinal properties, but is less aromatic and more stimulant. It is said to contain a peculiar principle, termed *liriodendrin*. It may be given in *powder*, in the dose of ℈j to ʒij; and in *infusion*, *decoction*, and *tincture*.

ANGUSTURA—ANGUSTURA BARK.

Angustura BARK is derived from Galipea officinalis (*Nat. Ord.* Rutaceæ), a small tree of the district of country bordering on the Orinoco, in South America. It occurs in pieces of various length and size; sometimes flat, sometimes slightly curved, but rarely entirely quilled. Externally, it is of a light gray colour, and is covered with lichens, with a soft, spongy epidermis, which is readily scraped off; internally, the colour is yellowish-brown. It has a disagreeable smell, and a bitter, aromatic, somewhat pungent taste. It imparts its virtues to water and alcohol, and contains a volatile oil and bitter principle. The bark of Strychnos nux vomica has been sometimes mixed with Angustura bark, and is thence known as *false angustura bark*.

Effects and Uses.—Angustura bark is a stimulating tonic, and in large doses acts on the stomach and bowels. From its liability to adulteration with the bark of Strychnos nux vomica, it has fallen into disuse, and it has no superiority over serpentaria and others of the indigenous aromatic bitters. Dose, in *powder*, gr. x to ʒss; of the *infusion* (ʒss to boiling water Oj), f ʒij, repeated.

CASCARILLA.

This is the BARK of Croton Eleuteria (*Nat. Ord.* Euphorbiaceæ), a small tree of the Bahamas and other West India islands. It occurs sometimes in the form of small, thin fragments—sometimes in that of rolled pieces, one or two inches long, occasionally longer, and varying in size from that of a quill to that of the little finger. It is usually covered with a white rugous epidermis, and is of a brown colour beneath. It has a warm, spicy, and bitter taste, and an aromatic, agreeable odour, which is particularly fragrant when it is burned. It yields its properties to alcohol, and partially to water; and contains volatile oil, resin, and a bitter principle, called *cascarillin*.

Effects and Uses.—Cascarilla is a very pleasant aromatic bitter, causing neither vomiting or purging, and hence agreeing very well with the stomach. It may be given in *powder* in the dose of ℈j to ʒss; but this is a less agreeable form than the *infusion* (ʒj, to boiling water Oj), of which the dose is f ʒij.

CANELLA.

This is the BARK of Canella alba (*Nat. Ord.* Meliaceæ), a large tree of the West Indies and South America. It comes in quilled pieces of a whitish-yellow colour, or in flat fragments, which are thicker and darker. It has an aromatic odour, and a warm, pungent, aromatic, and somewhat bitter taste. It imparts its virtues to alcohol, and partially to water; and contains volatile oil, resin, bitter extractive, gum, &c.

Effects and Uses.—An aromatic tonic, little employed except in combination. *Pulvis Aloës et Canellæ, Powder of Aloes and Canella*, popularly known as *hiera picra*, consists of aloes ℔ j, canella ʒiij; dose, gr. x to ℈j.

WINTERA—WINTER'S BARK.—The BARK of Drymis Winteri (*Nat. Ord.* Magnoliaceæ), a large tree of the southern part of South America, possesses analogous properties to Canella, but is not much used in this country. It is of a pale-yellowish or dull reddish-gray colour, externally, with darker spots and of a cinnamon colour internally.

ASTRINGENT BITTERS.

CINCHONA—PERUVIAN BARK.

The name Cinchona (derived from the Countess del Cinchon, wife of a viceroy of Peru), is applied to the BARK of different species of Cinchona (*Nat. Ord.* Cinchonaceæ), large trees which grow in the mountainous regions of the western portion of South America, from the nineteenth degree of south latitude to about the tenth degree of north latitude. Three principal varieties of cinchona are known in commerce: CINCHONA FLAVA (YELLOW BARK), called in commerce *Calisaya Bark*, derived principally from Cinchona Calisaya, and, in some quantity also, from C. Boliviana; CINCHONA PALLIDA (PALE BARK), called in commerce *Loxa* and *Lima Bark*, derived from Cinchona Condaminea and Cinchona Micrantha; and CINCHONA RUBRA (RED BARK), derived from an unknown species of Cinchona, though by some writers supposed to be furnished by the same species as the pale bark, but taken from the larger branches or trunk.

Peruvian Bark is brought to the United States from the Pacific ports of South America. It is obtained by stripping the trunks and branches of the Cinchona trees during the dry season, and is dried by exposure to the sun, during which process it usually becomes quilled.

1. The *Yellow* or *Calisaya Bark*, comes both in quilled and flat pieces. The former are from three or four inches to a foot and a half long, from a quarter of an inch to two or

three inches in diameter, and of variable thickness. They have a brownish epidermis (with longitudinal wrinkles and transverse fissures), which possesses none of the virtues of the bark. The bark itself is one or two lines thick, compact, of a short fibrous texture, and when broken presents shining points. The flat pieces, which are derived from the large branches and trunk, are usually destitute of epidermis, are more roughly marked externally, and are of a browner hue than the quilled pieces. They are also less compact, less bitter, and of less medicinal virtue. The yellow bark is distinguished from the other barks by its much more bitter taste; its comparative freedom from astringency; its brownish-yellow, somewhat orange colour, which is still brighter in the powder; and by *containing a larger proportion of quinia with very little cinchonia.*

2. The *Pale Bark* comes in cylindrical pieces of variable length, sometimes singly, sometimes doubly quilled, from two lines to an inch in diameter, and from half a line to two or three lines in thickness—the best kinds being about the size of a goose-quill. Their exterior surface is rough, marked with fissures, and of a grayish colour, owing to adhering lichens. Their interior surface is of a cinnamon colour, and, in the finer sorts, smooth. The colour of the powder is a pale fawn. The taste is moderately bitter, and somewhat astringent; the odour feeble, but rather aromatic in the powder and decoction. The pale barks *contain a much larger proportion of cinchonia than of quinia;* and, from their yielding little quinia, have fallen into disuse in the United States.

3. The *Red Bark* usually comes in large, thick, flat pieces; sometimes also in quills from half an inch to two inches in diameter. They are covered with a reddish-brown, rugged epidermis, beneath which is a dark-red, brittle, and compact layer, the interior parts being woody and fibrous, and of a lively brownish-red colour. The taste of red bark is bitter

and astringent; its odour not different from that of the other barks; its powder is reddish. It *contains considerable quantities both of quinia and cinchonia.*

Under the name of CARTHAGENA BARKS, several inferior varieties of cinchona are brought to this country from the northern Atlantic ports of South America. They contain quinia and cinchonia, but in small proportions, and are not recognised by the Pharmacopœias, though kept in the shops, for tooth-powder, &c.

Chemical Constituents.—The active ingredients of cinchona are two alkaline principles, termed *quinia* and *cinchonia*, which exist in combination with an acid called *kinic*. These alkalies are found in different proportions in the different barks, quinia being obtained from the *yellow* bark most abundantly, cinchonia from the *pale* bark, and the two principles in about equal proportion from the *red* bark. Other principles found in cinchona are tannic acid, colouring matter, starch, fatty matter, kinate of lime, lignin, &c. Gum is found in the pale bark, but not in the yellow or red barks.

Quinia is obtained in the following manner: Powdered yellow bark is boiled in water acidulated with muriatic acid, by which the alkali is separated from its combination with kinic acid, to form a soluble muriate. By the addition of lime, this salt is decomposed, and quinia precipitated. It is separated from insoluble impurities by digestion in boiling alcohol, and, after being concentrated, is decolorized by means of animal charcoal. Or, it may be obtained by heating the sulphate with an alkaline solution. It is whitish, and usually flocculent, bitter, almost insoluble in water, but soluble in alcohol, ether, and the fixed and volatile oils. It unites with acids to form salts, the most important of which is the officinal salt, the sulphate. *Cinchonia* is a white crystalline substance, less bitter than quinia, almost insoluble in cold water, very soluble in boiling alcohol, and slightly soluble in ether

and the fixed and volatile oils. The medicinal properties of quinia and cinchonia are thought to be the same.

Incompatibles.—The alkalies and alkaline earths precipitate the alkaline principles of cinchona; tannic acid forms with them insoluble compounds.

Physiological Effects.—The *topical* effects of cinchona are slightly irritant, and, from the tannic acid which it contains, astringent. Its *constitutional* action upon persons in health, results in a disordered condition of the stomach, and of the vascular and cerebro-spinal systems, as shown by gastro-enteric irritation, fever, headache, and giddiness. But, in persons suffering from debility, it proves a most energetic stomachic and corroborant; and over certain morbid conditions, as malarious fevers and periodical diseases, it exercises a control more striking than is shown by any other medicinal agent, in the treatment of diseases.

Medicinal Uses.—The most important therapeutic employment of bark is as a febrifuge in the treatment of fevers of a malarious origin. Its efficacy in these diseases was first made known to the world by the Jesuit missionaries in Peru, from whom it was called *Jesuit's powder.* The type of malarious fever in which the powers of bark are most strikingly displayed, is *intermittent;* the non-malignant and uncomplicated forms of which it rarely if ever fails to control. It may be given in these cases almost from the very onset of the attack, unless contra-indicated by the presence of gastric irritability, which must be first removed by an emetic or mercurial purge. In *remittent fevers,* bark is scarcely less useful than in *intermittents;* and most physicians who practise in malarious districts, now concur in recommending its exhibition in these fevers, as soon as it can be borne well by the stomach, without waiting for a very decided remission. In the *pernicious* or *congestive* forms of intermittent and remittent fevers, the early administration of large doses of bark or its preparation,

the sulphate of quinia, in combination with stimulants, is imperatively demanded. In yellow fever, the declining stages of continued and typhous fevers, the malignant exanthemata, gangrene, malignant erysipelas, carbuncle, extensive suppurations, the typhoid forms of diseases generally, the hectic of phthisis, acute rheumatism, diarrhœa, dysentery, and cholera, and various disorders of the nervous system, as neuralgia, tetanus, and chorea, bark and its preparations are constantly employed. It is also much used as a stomachic and general tonic, but where gastric susceptibility exists, as in convalescence from acute diseases, some of the simple bitters are preferable. *Topically*, bark is employed as an astringent and antiseptic.

Administration.—The use of bark, in *powder*, since the discovery of the sulphate of quinia, has been very much abandoned, owing to its bulk and disagreeable taste. When exhibited in this form, ℥ss to ℥j is the dose as a *febrifuge*, given usually in divided doses; as a tonic, ʒj. The following officinal preparations are employed: *decoction* (℥j to Oj of water, to be boiled for ten minutes, and aromatic sulphuric acid fʒj may be afterwards added), dose, f℥ij, repeated; *infusion* (℥j to water Oj, to which aromatic sulphuric acid fʒj may be added), dose, f℥ij, repeated; *extract*, dose gr. x to gr. xxx, equivalent to ʒj of bark; *tincture* (℥vj to diluted alcohol Oij), dose, fʒj to fʒiv; *compound tincture* or *Huxham's tincture* (containing also Virginia Snakeroot and aromatics), dose fʒj to fʒiv; a *fluid extract* has also been lately introduced, of the strength of ℥ss of bark to f℥j of extract. In prescribing bark, opium or port wine is often given with it, when it acts on the bowels. It is also occasionally combined with serpentaria. And, when the stomach will not retain it, it has been used externally in the form of *cataplasmata*, *pediluvia*, *bark-jackets*, &c., though for external use, the endermic exhibition of the sulphate of quinia is the ordinary resort.

QUINIÆ SULPHAS—SULPHATE OF QUINIA.—This salt is prepared by treating quinia (as obtained from yellow bark in the process described at p. 92), with sulphuric acid. It occurs in fine, silky, rather flexible, needle-shaped crystals, which are odourless, very bitter, and slightly efflorescent. It is soluble in boiling water, alcohol, and the diluted acids, very slightly soluble in cold water, but, by the addition of sulphuric acid, it is converted into a more soluble neutral sulphate. The officinal sulphate is chemically a *disulphate* or *subsulphate*, consisting of two equivalents of base to one of acid. Various substances are mixed as adulterations with the sulphate of quinia. They may be detected by adverting to their relative solubility in different menstrua, as compared with the sulphate, or by chemical tests. Thus, gum and starch are left behind by alcohol; salicin becomes red on contact with sulphuric acid, &c.

Effects and Uses.—The effects of sulphate of quinia on the system are the same as those of Peruvian bark, and, from its being less apt to disagree with the stomach, it has to a great extent superseded the use of the latter. In large doses it produces headache, ringing of the ears, and sometimes vertigo, amaurosis, deafness, delirium, and other evidences of a powerful action on the cerebro-spinal system.

Administration.—The ordinary dose of the sulphate of quinia, as a febrifuge, is gr. xij, equal to about ʒj of bark; as a general tonic, gr. i to gr. iij. It may be given in pill, or dissolved in water, by the aid of aromatic sulphuric acid; also as an enema, or endermically. The solution has been used externally in gonorrhœa, &c. Many other salts of quinia than the sulphate have been introduced into practice, but they possess no advantage over the officinal salt. The salts of *cinchonia* may be employed for the same purposes as those of quinia.

CORNUS FLORIDA—DOGWOOD.

Fig. 9.

Cornus Florida, or Dogwood (*Nat. Ord.* Cornaceæ), is an indigenous tree, found in most parts of the United States, and growing in the Middle States to the height of from fifteen to twenty feet. Its flowers are remarkable for large four-leaved white or pinkish involucres, which appear with us, in May. The officinal portion is the BARK, that of the root being preferred. It occurs in pieces of various size, more or less rolled, of a reddish-gray colour, with occasionally a fawn-coloured epidermis. Its odour is slight; its taste bitter,

astringent, and slightly aromatic. It yields its virtues to water and alcohol, and contains resin, bitter extractive, tannic and gallic acids, &c.

Effects and Uses.—Dogwood is deservedly esteemed the best substitute for cinchona among the native astringent bitters. It is somewhat stimulant, and not unfrequently disorders the stomach. Dose, in *powder*, ℈j to ʒj; of the *decoction* (ʒj to water Oj), f ʒij may be given.

SALIX—WILLOW.

The BARK of Salix alba, or the White Willow (*Nat. Ord.* Salicaceæ), is ranked among the astringent bitters. It is little employed, however, except in the form of *salicin*, its active principle, which consists of white, slender, silky crystals, soluble in water and alcohol, but not in ether. It has been used as a substitute for the sulphate of quinia, but is very inferior to it as a febrifuge. As a general tonic, however, it is useful, and may be given in the dose of from gr. x to gr. xxx. The sulphate of quinia is often adulterated with salicin, but the fraud may be detected by the addition of sulphuric acid, which strikes a blood-red colour with salicin.

PRUNUS VIRGINIANA—WILD-CHERRY BARK.

The wild-cherry has long been known under the name of Prunus Virginiana, which is still retained by the Pharmacopœia. This name, however, belongs to another tree, the choke-cherry; and the wild-cherry is now properly distinguished as Cerasus serotina (*Nat. Ord.* Drupaceæ). It is a large indigenous tree, attaining a great height and size in the South-western States, but usually with us about twenty-five to thirty feet high. The trunk is covered with a rough blackish bark, which detaches itself semicircularly; the leaves are ovate, oblong, and acuminate; the flowers, which appear in May,

are white, and are followed by fruit about the size of a pea, of a purplish-black colour, and a not unpleasant bitterish taste. The medicinal portion is the INNER BARK of the root and tree, the former of which is the more active. It is found in the shops, in pieces of various length and size, deprived of the epidermis, and slightly curved, of a reddish-brown colour, and a bitter aromatic taste.

It contains resin, starch, and tannic and gallic acids, and yields on distillation a volatile oil, nearly identical with the oil of bitter almonds, which does not pre-exist in the bark, but is formed by the action of water on amygdalin, as in the almond. It probably contains also the bitter principle, phloridzin. Boiling water impairs its virtues.

Effects and Uses.—Wild-cherry bark is tonic, with some astringency, and at the same time exercises a sedative influence on the nervous and circulatory systems, owing to the hydrocyanic acid, which is developed in it. It is used with excellent effect as a sedative corroborant in various forms of pulmonary irritation, particularly in the latter stages of pneumonia, and in the hectic of phthisis. It is also a useful stomachic and tonic in a variety of cases. The proper form of administration is the *infusion* (℥ss to cold water Oj), in the dose of f℥ij twice or thrice daily. A *syrup* is officinal, and is an agreeable preparation. Dose, f℥j.

The ROOTS of Geum rivale, or Water Avens, and Spiræa tomentosa, or Hardhack (*Nat. Ord.* Rosaceæ), and of Frasera Walteri, or American Columbo (*Nat. Ord.* Gentianaceæ); and the BARK of Prinos verticillatus, or Black alder (*Nat. Ord.* Aquifolaceæ), are indigenous astringent tonics of considerable power.

MINERAL TONICS.

FERRI PRÆPARATA—PREPARATIONS OF IRON.

The preparations of Iron (Ferruginea), termed also *Chalybeates*, and *Martial* preparations, are the most important of the mineral tonics. Besides their local tonic-astringent effect and their general corroborant action on the cerebro-spinal system, which they possess in common with the other mineral tonics, they exercise a restorative influence on the composition of the blood, by increasing the number of its colouring particles, and the amount of its solid constituents. Their effects are best observed in conditions of the system, in which there is a want of these elements of the blood. Under the use of chalybeates, in such cases, while the digestive functions are promoted, the pulse becomes fuller and stronger, the skin assumes a healthy tint, the lips and cheeks become more florid, the temperature of the body is increased, and the muscular strength is greatly invigorated. On the other hand, the administration of the ferruginous preparations in health, or too long-continued, produces symptoms of plethora, vascular excitement, and a tendency to congestion and hæmorrhage.

The diseases in which chalybeates are most serviceable, are those which depend on a deficiency of the red corpuscles of the blood, as the various forms of *anæmia*, particularly where this is connected with irregularity of the uterine functions; also scrofula, tuberculosis, and cachectic conditions of the system, characterized by a pale flabby condition of the solids. Many forms of nervous disorder, as neuralgia, chorea, hysteria, and epilepsy, are very decidedly controlled by the preparations of iron, and they probably constitute the best remedies in these affections, when attended with anæmia. Several of the preparations of iron are also much employed both as stomachics and astringents.

The following are the officinal preparations of iron:

FERRI FILUM—IRON WIRE.—Used for pharmaceutical purposes only.

FERRI RAMENTA—IRON FILINGS—are generally procured from the workshop of the smith; but, thus obtained, they are usually impure, and they should be prepared by filing a piece of iron with a clean file. Metallic iron is inert, or acts only mechanically; but, when taken into the stomach, it is oxidized, and acquires medicinal activity. Iron filings may be given in the dose of gr. v. to gr. xx.

FERRI PULVIS—POWDER OF IRON.—Metallic iron is obtained for medicinal purposes in the form of an impalpable powder, by reducing the sesquioxide by passing a stream of hydrogen gas over it. It is a tasteless, iron-gray powder, and should be kept in a well-stopped bottle, owing to its great liability to oxidation. It is a mild though feeble chalybeate, and is a favourite prescription with many practitioners, in the treatment of chlorosis and other varieties of anæmia. Dose, gr. v to gr. x, three times a day, in the form of pill, made with sugar and gum.

FERRI SUBCARBONAS—SUBCARBONATE OF IRON.—This salt is obtained by the double reaction of solutions of sulphate of iron and carbonate of soda. It is at first a white precipitate; but by exposure to the air it becomes greenish, and afterwards rust-coloured, being converted into the *sesquioxide* by the absorption of oxygen, and the evolution of carbonic acid. It has a disagreeable, slightly styptic taste, is insoluble in water, but readily dissolves in hydrochloric and sulphuric acids, and carbonic acid water. It is one of the most valuable of the ferruginous compounds, free from local irritation, and readily dissolved in the fluids of the stomach; and is much employed in chlorosis, chorea, neuralgia, and even pertussis and tetanus. Dose, gr. v to gr. xxx, three times a day.

PILULÆ FERRI CARBONATIS—PILLS OF CARBONATE OF IRON.—*Vallet's Ferruginous Pills.* To protect the carbonate of iron from oxidation, it is prepared (as in the process last described), by dissolving the reacting salts in weak syrup instead of water; honey and sugar being afterwards added, to preserve it unaltered and bring it to the pilular consistence. This preparation, from its unchangeableness, is preferred to the ordinary subcarbonate, and is one of the most popular of the chalybeates. Gr. x to gr. xxx of the pilular mass may be taken in divided doses through the day.

Mistura Ferri Composita, Compound Mixture of Iron, is a mixture of the carbonate of iron (prepared by the reaction of sulphate of iron and carbonate of potassa), with myrrh, spirit of lavender, and rose-water, and sugar to resist oxidation. It is a favourite chalybeate in chlorosis and amenorrhea. Dose, f℥j to f℥ij, three times a day. *Pilulæ Ferri Composita, Compound Pills of Iron,* are prepared with carbonate of soda, sulphate of iron, myrrh, and syrup.

FERRI SULPHAS—SULPHATE OF IRON,—known, in its impure state, as *green vitriol* or *copperas,* is prepared for medicinal use by dissolving iron wire in diluted sulphuric acid, with heat. It is a sulphate of the protoxide, and occurs in transparent, pale bluish-green crystals, of an acid styptic taste, soluble in water, but insoluble in alcohol. By exposure to the air, they effloresce, absorb oxygen, and become yellowish-white, from the formation of sulphate of the sesquioxide. When heated to 212°, they give out six of their seven equivalents of water, and are converted into a grayish-white mass, known as the *dried* sulphate. Sulphate of iron is one of the most active of the ferruginous preparations, but its local effects are powerfully astringent, and in a concentrated form it acts as an irritant poison. It is preferred to other chalybeates, where there is much relaxation of the solids, with excessive discharges; but it is not so well adapted to long-continued use, on account

of its local irritant action. Topically, it is employed in substance and solution, as a styptic and astringent. Dose, gr. i to gr. v, in pill; of the dried, gr. ss to gr. iij.

TINCTURA FERRI CHLORIDI—TINCTURE OF THE CHLORIDE OF IRON.—This is prepared by dissolving the subcarbonate (sesquioxide) of iron in muriatic acid, and afterwards adding alcohol. It is a tincture of the sesquichloride, though there is probably some reaction between the acid and alcohol, as the preparation has an ethereal odour. It is of a reddish-brown colour, and has a sour, styptic taste. It is one of the most effective of the chalybeates, acting locally as an energetic astringent and styptic, and, in large doses, as an irritant. Its indications, both general and topical, are very analogous to those of the sulphate, with the addition of some specific action on the urino-genital apparatus, which renders it applicable to the treatment of affections of these organs. Dose, ♏x to ♏xxx, gradually increased to ʒj or ʒij, and taken in some mild diluent.

FERRI IODIDUM—IODIDE OF IRON.—This salt is the *protiodide* of iron, and is made by the addition of iron filings to a mixture of iodine in distilled water. By evaporation, with as little contact of air as possible, green tabular crystals are obtained, of a styptic taste, volatile, deliquescent, and very soluble in both water and alcohol. But, by exposure to the air, the protiodide of iron undergoes decomposition: a portion of the iron parting with its iodine, and becoming oxidized. Hence, the salt is hardly fit for medicinal use, unless protected from decomposition, as in the officinal

Liquor Ferri Iodidi (*Solution of Iodide of Iron*), which is prepared with the addition of sugar. This is an excellent alterative tonic, combining the effects of iodine and of iron, and is particularly applicable to the treatment of scrofula, visceral engorgements, phthisis, &c. Dose, ten drops three times a day.

FERRI ET POTASSÆ TARTRAS—TARTRATE OF IRON AND POTASSA,—is prepared by the addition of hydrated oxide of iron to a mixture of bitartrate of potassa in distilled water. It occurs in transparent scales of a ruby-red colour, which are wholly soluble in water. The tartaric acid and potash, in combination in this preparation, render it less constipating than the other chalybeates; and from its agreeable taste, it is adapted to the diseases of childhood. Dose, gr. x to ʒss.

FERRI PHOSPHAS—PHOSPHATE OF IRON,—is obtained by the double reaction of solutions of sulphate of iron, and phosphate of soda, and is a phosphate of the protoxide. It is a white powder, insoluble in water, but soluble in dilute acids; by exposure to the air it absorbs oxygen, and acquires a blue colour. Dose, gr. v to gr. x.

FERRI CITRAS—CITRATE OF IRON,—is prepared by the addition of hydrated oxide of iron to a solution of citric acid. It is a citrate of the sesquioxide, and occurs in thin, transparent pieces, of a garnet-red colour, with a mild, acid, chalybeate taste, slowly soluble in cold water, but readily soluble in boiling water. Dose, gr. v to gr. x. The addition of a few drops of liquor ammoniæ converts this salt into an *ammonio-citrate*, which is more soluble and possesses antacid properties. Dose, the same.

LIQUOR FERRI NITRATIS—SOLUTION OF NITRATE OF IRON,—is prepared by the addition of iron wire to diluted nitric acid. It is tonic and astringent, agreeing very well with the stomach, and is employed in the treatment of chronic diarrhœa, hæmatemesis, hemorrhage from the bowels, and uterine hemorrhage, particularly when anæmic symptoms are present. Dose, gtt. x to gtt. xx, two or three times a day.

FERRUM AMMONIATUM—AMMONIATED IRON,—is prepared by evaporating a solution of sesquichloride of iron and muriate of ammonia. It is a mechanical mixture of these salts, and is of an orange-red colour, wholly soluble in water and diluted alcohol. It contains a small and variable quantity of iron;

but is considered a valuable deobstruent in glandular swellings, and in large doses is aperient. Dose, gr. iv to gr. xij, or more.

FERRI FERROCYANURETUM—FERROCYANURET OF IRON,—or *Pure Prussian Blue*, is obtained by the action of ferrocyanuret of potassium on sulphate of sesquioxide of iron. It is of a rich dark blue colour, without smell or taste, and is insoluble in water and alcohol. Its effects on the economy in health are not very striking; but it has been used both as an anti-periodic tonic, and in the treatment of neuralgia, chorea, &c. Dose, gr. v, three or four times a day.

Various other combinations of iron have been from time to time introduced into the practice of medicine; but they have no advantage over the more ordinary preparations. The *arseniate, acetate, lactate, tannate, bromide, valerianate, citrate of iron and quinia, citrate of iron and magnesia*, are recommended by various therapeutists. The *hydrated oxide* is employed exclusively as an antidote for arsenious acid, and will be noticed under the latter head.

CUPRI PRÆPARATA—PREPARATIONS OF COPPER.

Metallic copper is inert. The salts of copper act locally as caustics, irritants, and astringents. When exhibited in small doses, they exert a corroborant influence over the cerebro-spinal system, and are employed to fulfil the indications to which *tonics* are applicable, as in the cure of ague, neuralgia, epilepsy, &c. In larger doses, they act as *emetics;* and in excessive doses, they produce gastro-intestinal inflammation, and disorder of the nervous system. They are employed therapeutically, both as external and internal remedies; externally, as stimulants, astringents, styptics, and caustics; internally, as tonics, astringents, and emetics. In cases of poisoning from the cupreous compounds, the best antidote is *albumen*, as white of eggs, milk, wheaten flour. *Iron filings* and *ferrocyanide of potassium* are also recommended.

CUPRI SULPHAS—SULPHATE OF COPPER.—This salt known as *blue vitriol*, is obtained by roasting the native sulphuret, or by combining copper and sulphuric acid. It occurs in fine, prismatic, blue crystals, which, by exposure to the air, effloresce slightly, and become covered with a greenish-white powder. It has a styptic, metallic taste, is entirely soluble in water, but insoluble in alcohol. It is employed as a *tonic*, in doses of gr. ¼ to gr i, or more, in pill, repeated so as not to occasion vomiting. As an *astringent*, it may be given in the same doses, and will be found an extremely valuable remedy in the treatment of chronic diarrhœa, and chronic catarrh with profuse secretion. As an *emetic*, the dose is gr. iij to gr. v. Externally, it is used as an escharotic to fungous granulations, and in solution to arrest hemorrhages, mucous discharges, &c.

CUPRUM AMMONIATUM—AMMONIATED COPPER,—is made by rubbing together sulphate of copper and carbonate of ammonia. It is probably a double compound of cuprate of ammonia and sulphate of ammonia, and has a deep azure-blue colour, a styptic, metallic taste, and an ammoniacal odour. Its action is very similar to that of sulphate of copper; but it is used principally as an antispasmodic tonic in nervous disorders,—epilepsy, chorea, hysteria, spasmodic asthma, &c. Dose, gr. ½, gradually increased.

CUPRI SUBACETAS—SUBACETATE OF COPPER,—or *Verdigris*, occurs in pale bluish-green or blue masses or powder. The dose is gr. ⅛ to gr. ¼; but it is a powerful poison in an over-dose, and hence is rarely given as a tonic. The powder is used as an escharotic, and an *ointment* is officinal.

ZINCI PRÆPARATA—PREPARATIONS OF ZINC.

Zinc in the metallic state is inert. Its compounds are very analogous in their effects on the system to those of copper, but are less energetic. They are employed topically as caustics,

astringents, and desiccants; and internally, as tonics and antispasmodics, and in large doses, as emetics.

ZINCI SULPHAS—SULPHATE OF ZINC,—or *White Vitriol*, is prepared by dissolving zinc in diluted sulphuric acid. It occurs in small, colourless, transparent, prismatic crystals, resembling those of sulphate of magnesia. They have a metallic, astringent taste, are soluble in water, and insoluble in alcohol. Dose, as a *tonic, antispasmodic*, and *astringent*, gr. i to gr. v; as an *emetic*, it is the promptest and safest that can be given in cases of narcotic poisoning, in the dose of gr. x to gr. xx. Externally, it is much used in solution as an application to inflamed mucous membranes, in the strength of gr. i or ij to f℥ss of water.

ZINCI OXIDUM—OXIDE OF ZINC,—is made by exposing carbonate of zinc to heat. It is a white powder, insoluble in water, but soluble in diluted sulphuric and chlorohydric acids. It has been given as an antispasmodic tonic, in doses of gr. ij or iij, gradually increased to gr. viij or x; but is now chiefly used externally, as a dusting powder, or in the form of solution and *ointment*.

ZINCI ACETAS—ACETATE OF ZINC,—is made by adding zinc to a solution of acetate of lead, and occurs in white micaceous crystals, very soluble in water. It may be given internally as a tonic antispasmodic, in the dose of gr. i or ij, gradually increased; but it is chiefly used as a topical astringent in ophthalmia, gonorrhœa, leucorrhœa, &c., in the proportion of gr. ij to gr. vi, or more, to an ounce of water.

ZINCI CARBONAS PRÆCIPITATUS—PRECIPITATED CARBONATE OF ZINC,—is obtained by the double reaction of solutions of sulphate of zinc and carbonate of soda. It is a soft, white powder, similar in its action to the oxide, but is chiefly used as a dusting powder, and to make a mild astringent and desiccant *cerate*.

CALAMINA PRÆPARATA—PREPARED CALAMINE,—ob-

tained by heat from *calamine*, the native impure carbonate of zinc, is a pinkish powder, used as a desiccant, and in the form of a *cerate*, called Turner's cerate.

ZINCI CHLORIDUM—CHLORIDE OF ZINC,—is made by dissolving zinc in muriatic acid—nitric acid and chalk being added to remove any iron which may have been present with the zinc. It is a whitish-gray, semitransparent, deliquescent mass, having the softness of wax, and is soluble in water, alcohol, and ether. It has been employed internally in doses of gr. i or ij, as an antispasmodic tonic in chorea, epilepsy, and neuralgia. Its local action is that of a powerful caustic, and it is one of the best escharotics that can be exhibited, to produce healthy granulations in malignant or indolent ulcers. It may be used as a lotion in the strength of gr. ii to f℥i of water, or in the form of paste, made with one part of the salt to two or four of flour. A solution of the chloride of zinc is employed as an antiseptic, and is also injected into the blood-vessels of anatomical subjects to preserve them for dissection.

ARGENTI PRÆPARATA—PREPARATIONS OF SILVER.

In the metallic state, silver is wholly inert. The only preparation which is extensively employed is

ARGENTI NITRAS—NITRATE OF SILVER.—This salt is obtained by dissolving silver in diluted nitric acid. It occurs in transparent, colourless, prismatic crystals, which have a strongly metallic and bitter taste, and are wholly soluble in distilled water, and become blackened by the action of light, and organic matters. Its solution yields with chloride of sodium, a white precipitate, entirely soluble in ammonia.

Physiological Effects.—The topical action of nitrate of silver is that of a caustic or corrosive; and this effect is produced by its combining with the albumen and fibrin of the tissues. When applied to mucous membranes, it forms a

compound with the animal matter of the mucus, which protects the tissues from the action of the caustic. Hence, large doses may be taken with considerable impunity by the stomach. But, in excessive quantity, it may occasion gastro-enteric irritation, with disturbance of the nervous system; and, in these cases, the *antidote* is *common salt* (chloride of sodium), which produces, when in contact with the nitrate, nitrate of soda and chloride of silver. In medicinal doses, nitrate of silver has a specific corroborant and antispasmodic action on the nervous system; and, after absorption, produces a peculiar *blueness* or *slate-colour* of the skin.

Medicinal Uses.—*Internally*, nitrate of silver has been chiefly employed as an antispasmodic tonic in the treatment of epilepsy, and it is the most reliable remedy, that can be administered in this intractable affection. It is also used in chorea and gastrodynia, and as an astringent in dysentery. But, it is as an *external agent* that it is chiefly resorted to. It is the most efficacious application that can be made to inflamed mucous membranes, and either in the solid form, or in solution, it is employed in every variety of inflammation of this tissue. It is also extensively used to produce healthy granulations in wounds and ulcers, to arrest the progress of erysipelatous inflammation and variolous pustules, in porrigo and other skin diseases, in strictures, and to destroy the virus of chancres and of poisoned wounds.

Administration.—The dose of nitrate of silver internally is gr. ¼, gradually increased to gr. iij or iv, three times a day, in pill made with some mild vegetable powder. For external use, solutions are made of various strength, from gr. ij to ℥ss, in an ounce of distilled water. An ointment is also employed.

ARGENTI NITRAS FUSUS—FUSED NITRATE OF SILVER, LUNAR CAUSTIC.—For external use, in the solid form, nitrate of silver is melted and poured into small moulds.

ARGENTI OXIDUM—OXIDE OF SILVER—is obtained by adding solution of potassa to a solution of nitrate of silver. It is a tasteless, olive-brown powder, very slightly soluble in water. Its uses are analogous to those of the nitrate, and it is employed in epilepsy, gastrodynia, chronic diarrhœa, uterine disease, &c. Dose, gr. ss, to gr. ij, twice or thrice daily, in powder or pill.

BISMUTHI SUBNITRAS—SUBNITRATE OF BISMUTH.

This salt is prepared by dissolving bismuth in diluted nitric acid. It is a white, inodorous, tasteless powder, nearly insoluble in water. Its medicinal properties are tonic, antispasmodic, and astringent; and it has been employed in intermittent fever, but is now chiefly used to allay sickness and vomiting in chronic nervous affections of the stomach. Dose, gr. v. to ℈i, or even ʒss, in powder or pill. Externally, it is a good remedy in skin diseases in the form of ointment.

ACIDA MINERALIA—MINERAL ACIDS.

The diluted mineral acids are usually classed with tonics; but, although they exert a very considerable corroborant influence on the system, their action is in many respects peculiar and distinctive. In the concentrated form, they are corrosive. When properly diluted and swallowed in medicinal doses, they allay thirst, increase the appetite, and stimulate digestion. Before being absorbed, they become neutralized by combination with bases, and can therefore act as free acids only topically. They are employed—as tonics, usually in combination with the vegetable bitters, in intermittent, hectic, and typhoid fevers; as astringents and styptics in hemorrhage from the stomach and bowels; to allay febrile heat and cutaneous irritation; as antalkalines; and locally, as escharotics; and, in a very dilute solution, they are injected into the bladder as lithontriptics. In cases of poisoning from the mineral

acids, the alkaline earths and fixed oils are the proper antidotes.

ACIDUM SULPHURICUM — SULPHURIC ACID, — formerly called *Oil of Vitriol*, is obtained by burning sulphur, mixed with nitre, over a stratum of water contained in a chamber lined with sheet-lead. It is a dense, colourless, inodorous, corrosive liquid, which, in the concentrated form, is not employed internally, but is sometimes used externally, as a caustic. The proper *antidote*, in cases of poisoning from sulphuric acid, is magnesia, or solution of soap, and mucilaginous drinks should be afterwards freely administered.

ACIDUM SULPHURICUM DILUTUM—DILUTED SULPHURIC ACID,—contains one part of sulphuric acid and thirteen parts of distilled water. It is given as a tonic, refrigerant, and astringent, in the dose of from ten to thirty drops, three times a day, in water, and should be sucked through a quill to prevent injury to the teeth. It is used externally as a gargle, and wash to ulcers.

ACIDUM SULPHURICUM AROMATICUM—AROMATIC SULPHURIC ACID,—or *Elixir Vitriol*, is made by digesting sulphuric acid and alcohol with ginger and cinnamon. It is, chemically, a bisulphate of the oxide of ethule, and is a reddish-brown liquid, with an aromatic odour and a pleasant acid taste. It is an agreeable substitute for the diluted sulphuric acid, and is administerered in the same doses.

ACIDUM NITRICUM—NITRIC ACID,—is obtained by the action of sulphuric acid upon nitrate of potassa. When pure, it is colourless; but as found in the shops, it is usually of a straw colour, owing to the presence of nitrous acid. It is a corrosive, sour liquid, employed, in the concentrated form, as an escharotic to destroy warts and stimulate indolent sinuses, and diluted, as an astringent wash or gargle. Cases of poisoning from this acid are to be treated with magnesia and mucilaginous drinks. Internally, it is used in the form of

ACIDUM NITRICUM DILUTUM—DILUTED NITRIC ACID,—which contains one part of acid to six parts of distilled water. This is given as a substitute for sulphuric acid, but is more apt to disagree with the stomach; it is also employed as an alterative in syphilis. Combined with laudanum and camphor water, it is much used in the treatment of dysentery, under the name of *Hope's Camphor Mixture*. Dose, for internal use, 20 to 40 drops, three times a day, reduced with water.

ACIDUM MURIATICUM—MURIATIC ACID,—is an aqueous solution of chlorohydric acid, and is obtained by the action of sulphuric acid on chloride of sodium or common salt. It is, when pure, a transparent, colourless liquid, but has often a yellow colour, owing to the presence of iron or other contaminations. It has a corrosive taste, and a suffocating odour, and is an active poison, though less irritating than sulphuric and nitric acids. Magnesia or soap is the proper antidote. It is used, externally, as a caustic; internally, in the form of

ACIDUM MURIATICUM DILUTUM—DILUTED MURIATIC ACID—which contains one part of acid to three parts of distilled water. This is employed, in conjunction with the vegetable tonics, in typhus, malignant scarlatina, &c.; also to counteract phosphatic deposits in the urine, to prevent the generation of worms in syphilis, and in some forms of dyspepsia. Dose, 20 to 60 drops, which may be given in infusion of roses.

ACIDUM NITRO-MURIATICUM—NITRO-MURIATIC ACID.—This acid is made by mixing one part of nitric acid with two parts of muriatic acid, and is a compound of chlorine and nitric oxide, mixed with free chlorine. It has a golden-yellow colour, and emits the smell of chlorine. *Internally*, it is employed in the same cases as nitric acid, and is thought to be particularly efficacious in diseases of the liver and syphilis. *Externally*, it is used as a bath, either local or general, in syphilis and chronic hepatitis, for which purpose one or two

ounces of acid may be added to a gallon of water. Dose, from two to five drops, properly diluted and carefully increased.

ORDER V.—ASTRINGENTS.

These are medicines which produce contraction and corrugation of the tissues. Their constitutional effects are very analogous to those of tonics; as, like them, they increase the tone and vigour of the body, and exercise a control over various disorders of the nervous system. But they are chiefly employed to cure relaxation of the fibres and tissues, to subdue inflammation of superficial parts, and to arrest hemorrhage and excessive discharges from mucous membranes or other secreting surfaces. They are divided into *Vegetable* and *Mineral* astringents. The former owe their astringency to the presence of a principle termed TANNIC ACID, and differ from tonics in the absence of bitterness. The mineral preparations, usually classed among astringents, are those of alum and lead, and are distinguished from the mineral astringent-tonics, by their more decided astringency and a sedative action on the nervous system.

VEGETABLE ASTRINGENTS.

ACIDUM TANNICUM—TANNIC ACID.

This acid, which is the active principle of the vegetable astringents, is usually extracted from powdered galls by the action of ether. It is of a yellowish-white colour, and a strongly astringent taste, is very soluble in water, and soluble, though less so, in alcohol and ether. It produces a white flocculent precipitate with solution of gelatine, a bluish-black precipitate with the salts of the sesquioxide of iron, and white precipitates with solutions of the vegetable alkalies; and these substances are to be, therefore, considered *incompatible* with all the vegetable astringents. There is a variety of tannic acid, obtained from catechu and some other substances, which strikes a *greenish-black* precipitate with the salts of iron.

Effects and Uses.—Tannic acid is a powerful astringent, and is applicable to all the cases in which astringents are useful. It is greatly resorted to, internally, in the treatment of diarrhœa, dysentery, cholera, hemorrhage, colliquative sweats, &c.; also as an enema in diarrhœa, dysentery, prolapsus ani, and fissure of the rectum; and as a topical application, in inflammations and morbid discharges from mucous membranes, ulcers, &c. It is, perhaps, the best form in which the vegetable astringents can be employed, owing to the certainty and minuteness of the dose in which it can be given. Dose, gr. i to gr. iij, or iv, in pill, occasionally repeated.

ACIDUM GALLICUM—GALLIC ACID.

This principle is found in many of the vegetable astringents, but less uniformly than tannic acid, and is probably the result of changes which the latter has undergone. It is prepared by exposing a solution of galls to the air, when the tannic acid gradually absorbs oxygen and is converted into gallic acid. It occurs in small, silky, nearly colourless crystals, having a slight acid and astringent taste, and is soluble in boiling water, and slightly so in cold water.

Effects and Uses.—Gallic acid is a valuable astringent, which has of late been extensively employed in hemorrhagic disorders, as uterine hemorrhage, hemoptysis, hæmaturia, bloody diarrhœa, &c. It is used locally as a styptic, and to check discharges from mucous membranes. It may be given in doses of gr. ij to gr. v, in pill, every two or three hours.

GALLA—GALLS.

These are morbid EXCRESCENCES found upon Quercus infectoria, or the Gall Oak (*Nat. Ord.* Corylaceæ), a small tree or shrub of Asia Minor. The Gall-nuts are produced by the puncture of the buds by a fly (*Cynips quercûsfolii*), to form a nidus for its eggs. This occasions an irritation and flow of

juices to the part, resulting in the formation of a tumour round the larva, which, on attaining maturity, perforates the gall and escapes. Galls are imported from the Levant. The best are termed Aleppo Galls. Those from Smyrna are inferior, from their containing a larger admixture of white galls. Galls are spherical, about the size of a hickory-nut, but of varying dimensions, with small tubercles on their surface. The best are *bluish* or *black* externally, and grayish within, without odour, and of a very astringent, bitter taste. They yield their properties to both water and alcohol, but best to the former, and contain both tannic and gallic acids. *White* galls are collected after they have been perforated by the insect, and are inferior in astringency.

Effects and Uses.—Galls are powerfully astringent, but are not much used internally. In the form of infusion or decoction, they are employed as enemata in diarrhœa and dysentery, and also as gargles. Dose of the *powder*, gr. x to gr. xx. The *tincture* (℥iv to diluted alcohol Oij), may be given in the dose of f℥i to f℥iij, but it is chiefly used as a chemical test. The *ointment* (℥i to lard ℥vij) is a favourite application in hemorrhoids.

CATECHU.

Catechu, formerly called Terra Japonica, is an EXTRACT from the wood of Acacia Catechu, a small prickly tree of India (*Nat. Ord.* Fabaceæ). Twelve or fifteen varieties of the drug are described by pharmacologists; but it is usually met with in the shops, in masses of various shape and size, of a rusty brown colour externally, and varying internally from a reddish or yellowish-brown to a dark-brown colour. The best is of a dark colour, and is easily broken into small angular fragments, with a smooth glossy surface, bearing some resemblance to kino. It is without smell, and has an astringent, bitter taste. It contains 50 per cent. of tannic acid, and about 30 per cent. of a peculiar extractive, called *cate-*

chuic acid, to both of which it owes its peculiar properties. Alcohol dissolves it better than water.

Effects and Uses.—This is one of the most powerful and valuable of the vegetable astringents, much employed in diarrhœa, dysentery, hemorrhages, and in all cases of immoderate discharge, unattended with inflammatory action. It is a good deal used in relaxed conditions of the mouth and throat, also in aphthous ulcerations of the mouth, and spongy affections of the gums. Topically, it is employed as a styptic, &c. Dose of the powder, gr. x to ʒss, in bolus or emulsion. INFUSUM CATECHU COMPOSITUM (*Compound Infusion of Catechu*), is made by adding boiling water (Oj) to powdered catechu (ʒss), and cinnamon (ʒj)—dose, fʒj to fʒij, three or four times a day. Of the *tincture* (ʒiij to diluted alcohol Oij, with cinnamon ʒj), the dose is ℥xxx to fʒiij.

KINO.

The term *Kino* is applied to the INSPISSATED JUICE of several trees. Five varieties are known: 1. East India kino, which is the most common, and is the produce of Pterocarpus marsupium (*Nat. Ord.* Fabaceæ), a lofty tree of Malabar. 2. African kino, the original variety introduced into Europe, but now rarely met with; obtained from Pterocarpus erinaceus (*Nat. Ord.* Fabaceæ). 3. Jamaica kino, the product of Coccoloba uvifera, or Seaside Grape (*Nat. Ord.* Polygonaceæ), a small tree of South America and the West Indies. 4. Caraccas kino, which is probably derived also from Coccoloba uvifera. 5. Botany Bay kino, from Eucalyptus resinfera (*Nat. Ord.* Myrtaceæ), a large tree of Australia.

East India kino is met with in small, angular, shining fragments, of a dark-brown or reddish-brown colour, brittle, without smell, but with a very astringent taste. It contains 75 per cent. of tannic acid, of the second variety (see p. 112); the remainder being a red gum and catechuic acid.

Effects and Uses.—Kino is a powerful astringent, and is much used in diarrhœa, chronic dysentery, leucorrhœa, gonorrhœa, hemorrhages, &c. Externally, it is employed as a styptic, and as a stimulant to indolent ulcers. Dose of the *powder* gr. x to ʒss; of the *tincture* (ʒvi to diluted alcohol fʒviij), fʒi or fʒij may be given, and it is frequently added to chalk mixtures in diarrhœa. It spoils by keeping.

KRAMERIA—RHATANY.

Rhatany is the ROOT of Krameria triandra (*Nat. Ord.* Polygalaceæ), a shrub of Peru. It occurs in woody, cylindrical pieces, of the thickness of a goose-quill, to twice that size—many radicles being often united to a common head. They have a dark, reddish-brown bark, and a tough central ligneous portion, of a lighter red colour. They are without smell, but have a very astringent, slightly bitter, and sweetish taste, which is much stronger in the cortical than the ligneous portion; and, hence the smallest pieces should be preferred, as they contain the most bark. Rhatany yields a large proportion of tannic acid, and a peculiar acid, termed *krameric*, both of which probably contribute to its astringency. It imparts its properties to both cold and boiling water, but more fully to alcohol.

Effects and Uses.—Rhatany is powerfully astringent, with some tonic properties. It is much used in the treatment of diarrhœa, dysentery, hemorrhages, &c., and as an enema in fissure of the anus, hemorrhoids, leucorrhœa, &c. The powdered extract is an ingredient in many tooth-powders, and the tincture is also used as an astringent mouth-wash. Dose of the *powder* gr. xx to gr. xxx. But it is more employed in *infusion* (ʒj to boiling water Oj), dose, fʒj or fʒij; watery *extract*, dose gr. x to gr. xx; *tincture* (ʒvi to diluted alcohol Oij), dose, fʒj to fʒij; and *syrup*, dose fʒj to fʒss.

HÆMATOXYLON—LOGWOOD.

Logwood, or Campeachy wood, is the WOOD of Hæmatoxylon Campechianum (*Nat. Ord.* Fabaceæ), a medium-sized tree of Campeachy and other maritime parts of tropical America, and now naturalized in the West Indies. The portion used in medicine, and also as a dye, is the heart-wood, from which the bark and white sap-wood are removed, previously to exportation. It is imported in billets of different sizes, of a dark colour externally, and a deep red internally; in the shops it is kept in chips or raspings. It has a sweetish, astringent, and rather peculiar taste, and a feeble, not unpleasant smell. It contains tannic acid, a bitter, astringent, colouring principle, called *hæmatin*, volatile oil, &c.

Effects and Uses.—It is a mild astringent, useful in chronic diarrhœa and dysentery, and particularly well adapted to the weakened condition of the bowels, which follows cholera infantum. It is given either in *decoction* (℥j to water Oij boiled down to Oj), in the dose of f℥j to f℥ij to adults, and f℥j to ℥ij to children; or watery *extract* in the dose of gr. x to ℥ss, in solution.

QUERCUS ALBA—WHITE OAK BARK. QUERCUS TINCTORIA—BLACK OAK BARK.

The barks of several species of American oaks possess astringent properties, and are probably to be found in the shops, but the only officinal varieties are Quercus alba, White Oak, and Quercus Tinctoria, Black Oak (*Nat. Ord.* Corylaceæ). The BARK is the portion used, but the leaves and acorns are also astringent. *White Oak Bark* is distinguished by its whitish colour. When prepared for use, it is deprived of its epidermis, and is of a light-brown colour and fibrous texture, with an astringent and bitterish taste. Water and alcohol extract its virtues, which depend mainly on the presence of tannic and gallic acids, with some extractive. *Black Oak*

Bark is more furrowed, has a darker colour, a more bitter taste, and stains the saliva yellow, when chewed; it is much employed as a dye, under the name of *quercitron*. It contains a larger proportion of tannic and gallic acids than the white oak bark.

Effects and Uses.—A decoction of white oak bark is a good remedy in diarrhœa and hemorrhages, and is employed as an enema in hemorrhoids, and prolapsus and fissure of the anus, as a gargle in relaxation of the uvula, and as an injection in leucorrhœa. It is used as a bath in the bowel complaints of children; and a poultice of the ground bark is applied in gangrene. Black oak bark is too irritating for internal exhibition; but for external use it is a stronger astringent than the white oak bark. Of the *decoction* (℥j to water Ojss, boiled down to Oj), f℥ij may be taken frequently.

GERANIUM—CRANESBILL.

One of the most powerful of the *indigenous* astringents is Geranium maculatum, Crowfoot, or Cranesbill (*Nat. Ord.* Geraniaceæ), a perennial herbaceous plant growing in moist woody situations, with an erect stem, one or two feet high, three to five-lobed, incised, pale-green, mottled leaves, and large purple flowers, which appear in April and May. The part used is the RHIZOMA, which should be collected in the autumn. This, when dried, occurs in wrinkled, rough pieces, from a quarter to half an inch in thickness, furnished with slender fibres, of a dark-brown colour externally, and a pale flesh-colour within. It has an astringent, but not bitter taste, little or no smell, and contains tannic and gallic acids, with some mucilage.

Effects and Uses.—This is an excellent simple astringent, agreeing very well with the stomach, and might be advantageously substituted for more expensive foreign drugs. It may be used internally to fulfil the indications of kino, rha-

Fig. 10.

tany, &c., in bowel complaints and hemorrhages, and topically as an enema, gargle, injection, &c. It is also a valuable styptic. Dose, in *powder*, gr. x to xx; of the *decoction* (℥j to water Ojss, boiled down to Oj), f℥j to f℥ij may be given.

A decoction in milk is given to children. An *extract* and *tincture* are also employed.

UVA URSI.

Fig. 11.

Arctostaphylos Uva Ursi, or Bearberry (*Nat. Ord.* Ericaceæ), is a small, trailing, evergreen shrub, with coriaceous, obovate leaves (somewhat like box leaves, and red whortleberry leaves), about half an inch in length, pale rose-coloured flowers, appearing from June to September, and small red berries, which ripen during the winter. It is found in the northern parts of Asia, Europe, and America. The LEAVES are the only part used. When dried, they have a faint hay-like odour, and a bitterish, astringent taste. They yield their virtues to water and alcohol, and contain tannic and gallic acids, extractive, resin, gum, &c.

Effects and Uses.—Uva Ursi is astringent, tonic, and diu-

retic, and exercises a particular control over discharges from mucous surfaces. Hence, its employment in catarrh of the bladder, chronic bronchitis, with profuse discharge, &c. It is also applicable to the ordinary uses of the vegetable astringents. Dose of the *powder*, ℈j to ℈ij, three times a day; but it is usually given in *decoction* (℥j, to water f℥xx, boiled down to Oj), of which f℥j to f℥ij may be taken three times a day.

CHIMAPHILA—PIPSISSEWA.

Chimaphila umbellata, Pipsissewa, Wintergreen, or Ground-Holly (*Nat. Ord.* Pyrolaceæ), is a small indigenous, evergreen plant, common to the northern parts of Europe, Asia, and America, and found abundantly in woody situations in all parts of the United States. It has an erect stem, three to ten inches high, lanceolate, somewhat wedge-shaped, serrated, dark-green leaves, arranged in irregular whorls, and beautiful five-petaled flowers, of a white colour tinged with red and a very agreeable perfume, which appear in June. The LEAVES are the officinal portion. In the fresh state, they have a fragrant smell when bruised, which they lose after drying. Their taste is bitterish and astringent, but somewhat aromatic. They contain tannic acid, bitter extractive, resin, and probably some acrid volatile constituent—as the fresh leaves, when bruised and applied to the skin, will cause redness and even vesication.

Chimaphila maculata, or Spotted Pipsissewa, possesses analogous properties to those of C. umbellata, from which it differs principally in the character of its leaves. They are of a deep olive-green colour, veined with greenish-white; and the flowers are a pure white, and appear in July.

Effects and Uses.—Pipsissewa is astringent and tonic, and also diuretic. It is employed in the disorders of the urinary organs, to which uva ursi is applicable, and also for its diuretic

Fig. 12.

properties in dropsy, attended with debility of the digestive organs. Indeed, it is classed by some therapeutists, among the diuretics. It is usually given in *decoction* (℥ij to water Oiij, boiled down to Oij), of which Oj may be taken in the

twenty-four hours; and a *fermented decoction*, made with molasses, ginger, and yeast, is often used. An *extract* is employed, in doses of gr. x to gr. xv.

The following vegetable astringents deserve notice, though less frequently employed than the foregoing.

GRANATI FRUCTUS CORTEX—POMEGRANATE RIND.—This is the RIND OF THE FRUIT of Punica granatum, the Pomegranate tree (*Nat. Ord.* Myrtaceæ), a small tree of northern Africa, Syria, and Persia, now naturalized in the warmer portions of Europe, the West Indies, &c. The rind of the fruit is a powerful astringent, but is little used internally, from its liability to occasion nausea. Dose, in *powder*, gr. xx to ʒss; but it is best given in decoction (ʒij to water Ojss, boiled down to Oj), dose fʒj.

ROSA GALLICA—RED ROSES. ROSA CENTIFOLIA—HUNDRED-LEAVED ROSES.—The PETALS of these two species of roses are officinal, but those of almost every other species of cultivated rose may be employed for the same purposes as the rosa centifolia. The red rose is a mild astringent, and is chiefly used in conjunction with sulphuric acid, in the *infusum rosæ compositum—compound infusion of roses*, (ʒss, to boiling water Oijss, diluted sulphuric acid fʒiij, sugar ʒjss)—dose, fʒij to fʒiv. The *confection* is used as a basis for pills. The hundred-leaved rose is slightly laxative. *Aqua rosæ—rose water*, distilled from the fresh hundred-leaved roses, is much employed in collyria, &c.

DIOSPYROS—PERSIMMON.—The UNRIPE FRUIT of Diospyros Virginiana (*Nat. Ord.* Ebenaceæ), an indigenous tree, is employed in diarrhœa, dysentery, and uterine hemorrhage, in infusion, syrup, and vinous and acetous tincture. The bark is bitter and astringent, but is not officinal.

TORMENTILLA — TORMENTIL. — The ROOT of Potentilla tormentilla (*Nat. Ord.* Rosaceæ), a European plant, is used

in Europe as an astringent, in the dose of ʒss to ʒj, but is seldom or never employed in this country.

RUBUS VILLOSUS—BLACKBERRY ROOT. RUBUS TRIVIALIS—DEWBERRY ROOT.—The ROOTS of Rubus villosus, and Rubus trivialis (*Nat. Ord.* Rosaceæ), the former, an erect, prickly shrub, and the latter, a creeping briar, are very efficient mild astringents, which have been used with excellent effect in bowel complaints, especially those of children. The astringency resides principally in the cortical portion, and hence, the smallest roots should be preferred; of the *decoction* (ʒj to water Oij, boiled down to Oj) fʒij may be taken frequently.

HEUCHERA—ALUM-ROOT.—The ROOTS of Heuchera Americana, and other species of Heuchera (*Nat. Ord.* Saxifragaceæ), indigenous plants, known under the common name of Alum-root, with radical leaves somewhat like those of the maple, and numerous radical flower-stems, one to two feet in height, with rose-coloured flowers arranged in pyramidal panicles—possess very decided astringent properties, and may be used both externally and internally.

CREASOTUM—CREASOTE.

Creasote is a peculiar substance obtained from tar. When pure, it is a colourless, oleaginous liquid, with a caustic, burning taste, and a penetrating, disagreeable odour, like that of smoked meat. It forms two solutions with water, one of 1 part to 80 parts of water, the other of 1 part of water in 10 parts of creasote; and it is soluble, in all proportions, in alcohol, ether, naphtha, and acetic acid. A remarkable property of creasote is its power of preserving meat, whence its name (from κρεὰς flesh, and σώζω, I save).

Effects and Uses.—Creasote, in large doses, is an acro-narcotic poison. In small doses, it is styptic and astringent, and, though not very nearly allied to the vegetable astringent ar-

ticles, which contain tannic acid, it is, perhaps, more generally administered for its astringent than for any other properties. It is an excellent remedy in hæmatemesis, and is also employed in hæmoptysis and other hemorrhages. It is very efficacious in allaying vomiting and gastric irritability, and has been exhibited for its astringent virtues with good effect in diarrhœa, diabetes, and chronic bronchitis, and as a nervine in epilepsy, hysteria, neuralgia, &c. Externally, it is applied, in various degrees of dilution, to indolent, sloughing, and foul ulcers; in several cutaneous affections; as a gargle in putrid sore throat; and for the relief of deafness. In the concentrated form, it is a good styptic in capillary hemorrhages, and is applied with effect to the hollows of carious teeth for the removal of the pain of toothache. There is no antidote in cases of poisoning from creasote, but stimulants are to be freely administered.

Dose, internally, one or two drops, frequently repeated, in pill, or diluted with mucilage. For external use, from two to six drops, or more, may be added to a fluid ounce of distilled water.

MINERAL ASTRINGENTS.

PLUMBI PRÆPARATA—PREPARATIONS OF LEAD.

Metallic lead is considered inert. The sulphuret and sulphate are probably also inactive; but, with these exceptions, all the compounds of lead possess more or less activity. When administered in therapeutical doses, they act as astringents in the alimentary canal, checking secretion, and causing constipation. After absorption, they produce a diminution in the volume and frequency of the pulse and in the activity of the secreting functions, and frequently arrest sanguineous discharges, both natural and artificial. In excessive doses, several of the saturnine compounds are irritant and corrosive poisons, giving rise to gastro-enteric inflammation. The proper

antidotes are sulphuric acid, or some alkaline or earthy sulphate, in solution in a large quantity of diluent.

When the system becomes impregnated with lead, either from the too long-continued use of its preparations medicinally, or from exposure to its influence in lead-factories, &c., a peculiar kind of *chronic poisoning* is produced, which shows itself in a variety of symptoms. The most usual form of lead poisoning is *colic*, sometimes termed *colica pictonum* or *painters' colic*, which is characterized by sharp abdominal pains, with hardness and depression of the abdominal parietes, obstinate constipation, nausea, vomiting, &c. Next in frequency is *lead arthralgy*, in which there are severe pains in the limbs, attended by cramps, hardness, and tension of the painful parts. *Lead paralysis* is another, though less common variety of the disease, and is characterized by a loss of voluntary motion, owing to the want of contractility of the muscular fibres of the affected parts. It most frequently affects the upper extremities and the extensor rather than the flexor muscles. Occasionally, functional *disease of the brain* is also observed as one of the consequences of lead poisoning. The absorption of lead into the system is recognised by a saturnine coloration of the gums, of the mucous membrane of the mouth, and of the teeth. The *antidotical* treatment of chronic lead poisoning consists in the internal administration of solutions of sulphuric acid and of soluble alkaline and earthy sulphates, and in the use of baths of sulphuret of potassium, dissolved in warm water, by which the salts of lead, deposited on the skin, are converted into the insoluble sulphuret. For lead colic, a combination of cathartics and opiates has been employed; but the best remedy is alum in doses of ʒi or ʒij, every three or four hours, dissolved in some demulcent liquid. In the treatment of lead palsy, strychnia and electricity may be used, but it is a very intractable form of the disease.

Therapeutically, the preparations of lead are employed as astringents, sedatives, and desiccants. For internal use, the acetate is almost exclusively employed. It is a most valuable remedy in hemorrhages, from its combined sedative and astringent influence, and is also very serviceable in fluxes from the mucous membranes, particularly of the bowels. Topically, lead washes are employed to relieve superficial inflammation, to arrest morbid discharges, and as desiccants.

PLUMBI ACETAS—ACETATE OF LEAD.—This salt, known also as *Saccharum Saturni* or *Sugar of Lead*, is made by immersing lead in pyroligneous or crude acetic acid. It occurs in colourless, needle-shaped crystals, which effloresce on exposure to the air. They have an acetous odour, and a sweetish, astringent taste, and are soluble in both water and alcohol. The mineral acids and their soluble salts, the alkalies and alkaline earths, and vegetable astringents, are *incompatible* with acetate of lead.

Effects and Uses.—The effects of this salt are those of the saturnine preparations, which have been already described. Its medicinal influence is sedative and astringent. In hemorrhages, it is more employed *internally* than any other remedy, usually in combination with opium. And this combination is also much resorted to in the treatment of diarrhœa, dysentery, and cholera, and may be prescribed with advantage to check the secretion of bronchitis and the night sweats of phthisis. As a *topical* remedy, acetate of lead, in aqueous solution, is extensively employed to relieve inflammation and diminish morbid discharges.

Dose, gr. i or ij to gr. viij or x, two or three times a day. When applied to mucous membranes, the strength of the solution may be gr. ss to gr. i or ij, to water f℥i—for phlegmonous inflammation, ℥ij to water Oj.

LIQUOR PLUMBI SUBACETATIS—SOLUTION OF SUBACETATE OF LEAD.—This preparation, frequently termed *Gou-*

lard's Extract, is an aqueous solution of the diacetate of lead, and is made by boiling acetate of lead and semivitrified oxide of lead in distilled water. It is a colourless liquid, which is decomposed on exposure to the air with the formation of insoluble carbonate of lead, and occasions a dense white precipitate with solution of gum. In other respects it resembles a solution of acetate of lead.

Uses.—It is chiefly employed, diluted, to promote the resolution of external inflammation and arrest discharges from suppurating, ulcerated, and mucous surfaces. The officinal dilution is *Liquor Plumbi Subacetatis dilutus*, commonly known as *lead water*, and consists of solution f℥ij, to distilled water Oj. *Ceratum Plumbi Subacetatis*, or *Goulard's Cerate*, is made with Goulard's Extract, white wax, olive oil, and camphor, and is an admirable dressing to excoriated and blistered surfaces, burns, scalds, &c.

PLUMBI IODIDUM—IODIDE OF LEAD,—is made by the double reaction of solutions of nitrate of lead and iodide of potassium. It is a bright-yellow, heavy, inodorous powder, sparingly soluble in cold water, but readily soluble in boiling water. It is chiefly used to reduce the volume of indolent tumours, and may be given internally in the dose of gr. iij or iv, or more, in pill; but it is principally employed externally in the form of *ointment* (℥i to lard ʒi).

PLUMBI NITRAS—NITRATE OF LEAD—made by dissolving litharge in diluted nitric acid, occurs in white, nearly opaque octohedral crystals, permanent in the air, of a sweet, astringent taste, and soluble in water and alcohol. It may be given *internally*, as a sedative astringent, in doses of gr. ¼ to gr. i, twice or thrice daily, in pill or solution. But its principal use is as a topical agent in the treatment of wounds, ulcers, and cutaneous affections. *Ledoyen's Disinfecting Fluid* is a solution of nitrate of lead ℥i in water f℥i.

PLUMBI OXIDUM SEMIVITREUM—SEMIVITRIFIED OXIDE

OF LEAD—or *Litharge*, is obtained in the process for extracting silver from argentiferous galenas. It occurs in minute yellowish or orange-coloured scales, insoluble in water, and is never employed *internally*. It is sometimes sprinkled over ulcers, but its chief use is in the preparation of *Emplastrum Plumbi* or *Lead Plaster*, which is made by boiling litharge with olive oil and water, and is, chemically, a mixture of oleate and margarate of lead. It serves as a basis for most of the other plasters. *Emplastrum Saponis*, *Soap Plaster*, made by rubbing up soap with lead plaster, is an excellent discutient.

PLUMBI CARBÒNAS—CARBONATE OF LEAD,—or *White Lead*, is manufactured in this country by exposing lead to the fumes of vinegar or acetic acid. It is a white powder, without smell or taste, and insoluble in water. It is never administered *internally*, but is employed as a dusting powder—though there is danger of its absorption. *Unguentum Plumbi Carbonatis*, is a good application to burns, &c.

ALUMEN—ALUM.

Alum is a double salt, a sulphate of alumina and potassa. It is found native in the neighbourhood of volcanoes, but is usually manufactured from alum ores, and sometimes by the direct combination of its constituents. It crystallizes in regular octohedrons; but it is commonly found in the shops in large, colourless, transparent crystalline masses, without any regular form. It has an astringent and sweetish, acid taste; by exposure to the air it slowly effloresces; it is soluble in cold water, and more so in boiling water; and when heated, it undergoes the watery fusion, swells up, gives out its water of crystallization and is converted into a white, spongy mass, called *dried alum*. The alkalies and their carbonates, lime water, magnesia and its carbonate, nitrate of potassa, acetate of lead, and the vegetable astringents, are *incompatible* with alum.

Besides the common, or potash alum, there are varieties in which the potash is replaced by some other base, as ammonia or soda.

Physiological Effects.—The immediate topical effect of alum is that of a powerful astringent, in virtue of a chemical action on the tissues. When it is applied to a part, in large quantities, the astriction is soon followed by irritation; and thus, taken internally in excessive doses, it gives rise to vomiting, griping, purging, and even inflammation of the gastro-enteric mucous membrane. After its absorption, it acts as an astringent on the system generally, and produces astriction of the tissues and fibres, and a diminution of secretion.

Medicinal Uses.—Alum is employed *internally* in hemorrhages, chronic diarrhœa, colliquative sweating, diabetes, &c., and it is sometimes combined with cubebs in the treatment of gleet, gonorrhœa, and leucorrhœa. It has been recommended in dilatation of the heart and aneurism of the aorta, and has also been given as an emetic in croup. Its use in lead colic has been alluded to. As a *topical* remedy it is extremely valuable as an astringent antiphlogistic, in ophthalmia, angina membranacea, tonsillitis, &c.; to produce contraction of the tissues, in relaxation of the uvula, prolapsus ani, &c.; as a styptic in hemorrhages; and to arrest excessive secretion from the mucous surfaces.

Dose, gr. x to ℈j or ℈ij, in powder, or solution, or made into pills, with some tonic extract, and combined with an aromatic, as nutmeg, to prevent nausea. It may be agreeably given in the form of *whey*, prepared by boiling ℥ij with milk Oj, and straining, of which the dose is f℥ij. *Topically*, it is employed in the forms of powder, solution, and poultice, the latter of which is made by rubbing up whites of eggs with alum, and is applied to the eye in ophthalmia, between folds of linen. *Dried alum* (*Alumen exsiccatum*), is employed internally in the dose of gr. v–x, and externally as a mild escharotic.

ORDER VI.—STIMULANTS.

Stimulants, termed also excitants, are medicines, which by exciting the nervous and vascular systems, produce a temporary exaltation of the vital functions. Their action on the heart and arteries increases the temperature of the body, whence they are frequently denominated *calefacients*. In their passage out of the system, they stimulate the secreting organs, and often prove efficient diaphoretics, diuretics, and expectorants. *Topically*, they irritate and inflame the parts to which they are applied, and hence are classed with *irritants*.

They are employed principally in disorders known as asthenic, and in all conditions of the system attended with exhaustion. From their action in arousing the energies of the nervous system, they exercise a control over many nervous disorders, particularly those of a spasmodic nature. They are also frequently given with a view to their action on some one or other of the secretions. As stimulants to the gastro-intestinal canal, they are administered to promote digestion (when they are called *stomachics*), and to dispel flatulence (when they are known as *carminatives*). Topically, they are employed as *rubefacients*, *vesicants*, &c.

The more powerful and rapid stimulants are called *diffusible*. The stage of excitement which they produce is of a transient nature, and is generally followed by a condition of reaction. In over-doses, they act as violent narcotics and sedatives. The diffusible stimuli usually employed are vinous and spirituous liquors, and the preparations of ammonia. Vegetable stimulants which contain a volatile oil, are termed *aromatics*, and are usually given as stomachics and carminatives. Their volatile oils are also employed as local irritants.

DIFFUSIBLE STIMULANTS.

ALCOHOL.

Alcohol is a product which results from a process termed the vinous fermentation, in substances containing grape sugar. At a temperature of 80° F., the presence of a fermenting body converts a solution of grape-sugar into alcohol and carbonic acid. Alcohol is obtained from vinous or fermented liquors, by repeated distillation. For officinal purposes, it should be of the specific gravity 0·835, when it contains about fifteen per cent. of water. It is a colourless, inflammable liquid, wholly vaporizable by heat, and unites in all proportions with water and ether.

Physiological Effects.—Alcohol is the intoxicating ingredient of all vinous and spirituous liquors. It is a powerful diffusible stimulant—in small doses, exciting the vascular and nervous systems, increasing the heat of the body, exhilarating the mental faculties, and stimulating the secretions. In excessive quantity, it acts as a narcotic poison, producing coma and death. The treatment in cases of poisoning from alcohol is the same as that which is to be pursued in cases of poisoning from opium. The habitual use of alcoholic stimuli gives rise to a well-known train of mental and physical disorders :— dyspepsia, visceral obstructions, gout, dropsy, mania-a-potu, and even confirmed insanity. *Topically*, alcohol acts as an irritant.

Medicinal Uses. — Alcohol, in the form of vinous and spirituous liquors, is employed to rouse and support the system in asphyxia, syncope, the latter stages of acute attacks, typhoid and malignant diseases, and in poisoning from foxglove, tobacco, and other narcotics; also as a stomachic in colic, flatulence, indigestion, nausea, &c. In the treatment of mania-a-potu, the exhibition of some form of alcoholic

stimulus can scarcely be dispensed with. As a topical application, alcohol is used to produce cold by its evaporation; as a styptic; to harden the cuticle over delicate parts; and as a stimulant. Mixed with white of eggs, it forms a good coating to bed-sores.

ALCOHOL DILUTUM—DILUTED ALCOHOL, or *Proof Spirit*, —consists of equal parts of alcohol and distilled water, and has a sp. gr. 0·935. It is used exclusively for pharmaceutical purposes.

VINUM—WINE.—The fermented juice of the grape is employed medicinally, to support the system in typhoid fevers, exhausting chronic diseases, extensive suppurations, gangrene, &c. In low fevers, it constitutes our chief therapeutic resource, and may be administered to the amount of one or two pints, in the twenty-four hours, either pure, or in the form of *wine-whey*. This is made by adding from a gill to half a pint of white wine to a pint of boiling milk, separating the curd from the whey, and flavouring with sugar and spices.

The officinal wines are VINUM ALBUM, WHITE WINE (*Sherry*), and VINUM RUBRUM, RED WINE (*Port*). Port contains tannic acid, and is preferred in dysentery, diarrhœa, &c., for its astringency. *Madeira*, which is the strongest of the white wines, is an excellent stimulant, but may be objectionable from its acidity. *Champagne* is a pleasant stimulant, where gastric irritability is present. As articles of diet, the stronger wines, when used in excess, often produce gout, dropsy, and diseases of the kidneys and liver; and, except in advanced age, and in feeble constitutions, cannot but be considered as objectionable.

The *malt liquors* are useful where more permanent stimuli are called for, as in diseases tending to emaciation, chronic abscesses, &c. The best are porter and ale.

SPIRITUS VINI GALLICI—BRANDY—is obtained by the distillation of wine. It is the best stimulus, where a rapid

and decided impression is called for, as in collapse, syncope, &c.; and, from the tannic acid which it contains, is useful in bowel-complaints. *Rum*, the ardent spirit obtained from sugar, and *whiskey*, obtained by the distillation of fermented infusions of corn, may be used as substitutes for brandy. *Gin* is corn spirit flavoured with juniper; and, owing to the oil of juniper, which it holds in solution, it is an active diuretic as well as stimulant. *Arrack*, the spirit of Eastern countries, is prepared from fermented infusions of rice.

AMMONIÆ PRÆPARATA—PREPARATIONS OF AMMONIA.

Ammonia is a gaseous compound of hydrogen and nitrogen, usually obtained by the action of lime on sal ammoniac (or muriate of ammonia). It is a powerful stimulant and local irritant, but is rarely used in medicine. The following preparations of Ammonia are employed as diffusible stimuli:

LIQUOR AMMONIÆ FORTIOR—STRONGER SOLUTION OF AMMONIA.—This is an aqueous solution of ammonia, of the specific gravity 0·882. It is a colourless liquid, of a caustic, acrid taste, and a very pungent odour of ammonia; and is too strong for medicinal use in its unmixed state. It is a powerful corrosive poison, for which the diluted acids, as vinegar, lemon juice, &c., are the proper antidotes.

LIQUOR AMMONIÆ—SOLUTION OF AMMONIA—known also as *Aqua Ammoniæ*, or *Water of Ammonia*, has a specific gravity of 0·960, and is employed as a stimulant, sudorific, antacid, and rubefacient. As a stimulant, ammonia is admirably adapted for speedily rousing the action of the vascular and respiratory systems, particularly when it is an object at the same time to promote the action of the skin. For this purpose it is employed in low forms of disease, particularly in the typhoid exanthemata, in syncope, in asphyxia from narcotic poisons, and to counteract the effects of the bites of venomous animals. In dyspepsia, it is useful with a view to

the relief both of acidity and flatulence. For internal use, other preparations of ammonia are generally preferred, and this is used chiefly as a vesicant and rubefacient. As a *vesicant*, it has the advantage over cantharides of a more speedy operation and non-affection of the urinary organs. It may be employed either in the form of ointment or solution. As a *rubefacient*, the officinal *liniment* may be used (one part of solution of ammonia to two of olive oil). Dose, internally, ten to thirty drops, largely diluted.

SPIRITUS AMMONIÆ—SPIRIT OF AMMONIA—is a solution of ammonia in rectified spirit. It is given as a stimulant, antispasmodic, and carminative, in the dose of ten to thirty drops, diluted with water. But, a pleasanter preparation, with similar properties, is

SPIRITUS AMMONIÆ AROMATICUS—AROMATIC SPIRIT OF AMMONIA.—This is made by distilling a mixture of muriate of ammonia and carbonate of potassa, with cinnamon, cloves, lemon-peel, alcohol, and water. It is a very agreeable antacid stomachic and stimulant, and may be given in the dose of thirty drops to f℥j, or more, diluted with water.

AMMONIÆ CARBONAS—CARBONATE OF AMMONIA.—This salt, sometimes termed *volatile alkali*, is a *sesquicarbonate*, and is prepared by subliming a mixture of muriate of ammonia and chalk. It occurs in whitish, transparent masses, wholly dissipated by heat, of a pungent, ammoniacal odour, an acrid, alkaline taste, and is soluble without residue in water. On exposure to the air, it becomes opaque, falls into powder, and deteriorates by the loss of ammonia.

Effects and Uses.—Its indications are the same as those of solution of ammonia, to which it is preferred for internal exhibition as a diffusible stimulant. It has also been recommended in diabetes, and in scrofula, attended with a languid circulation. Dose, gr. v to xx, in pill, or preferably in solution with gum and sugar. Mixed with some aromatic oil (as that of ber-

gamot or lavender), it is used, as a *smelling salt*, in syncope, hysteria, &c.

PHOSPHORUS has been used, in small doses, as a diffusible stimulant; it is also diuretic and aphrodisiac. In over-doses, however, it is a most violent irritant poison, and is too dangerous for general medicinal use. It is given in *ethereal* solution, made into an emulsion. Dose, gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$. In cases of poisoning from phosphorus, after the administration of an emetic, *magnesia* should be given, suspended in large quantities of water.

AROMATICS.

Aromatics owe their virtues to the presence of oils, obtained from them by distillation, and termed DISTILLED OILS (OLEA DESTILLATA), sometimes also *volatile* and *essential* oils. These oils possess, in a high degree, the odour and taste of the plants from which they are procured. Locally, they are powerful irritants, and taken into the stomach, in over-doses, act as acrid poisons. They pass partially into vapour at ordinary temperatures, and are completely volatilized by heat: hence, decoctions and extracts are improper preparations of the aromatics. The distilled oils are inflammable, very slightly soluble in water, but soluble in alcohol and ether. Their ultimate constituents are, usually, carbon, hydrogen, and oxygen; and, on exposure to the air, they gradually absorb oxygen, become thicker, less odorous, and of a deeper colour, and are finally converted into resins.

CAPSICUM—CAYENNE PEPPER.

Cayenne pepper is the FRUIT of Capsicum annuum and other species of Capsicum (*Nat. Ord.* Solanaceæ), American tropical plants, naturalized in most warm climates, and cultivated in our gardens. C. annuum is an annual, about two

feet high, with an herbaceous, crooked, branching stem; ovate, pointed leaves; greenish-white flowers; and pendulous pod-like berries of a crimson or yellow colour, 2 or 3 inches long. These pods, when dried and ground, form Cayenne pepper, the best of which is the *African*. Powdered capsicum has a bright-red colour, which fades upon exposure to light; an aromatic, peculiar smell, and a bitterish, acrid, burning taste. The active principle is an oily or resinous substance, termed *capsicin*, which is slightly soluble in water, but very much so in alcohol, ether, and oil of turpentine.

Effects and Uses.—Capsicum is principally employed as a *condiment* and *stomachic*, and is very useful in torpid conditions of the digestive organs, or as an adjunct to other remedies to rouse the susceptibility of the stomach. Its constitutional effect is not in proportion to its local effect, and it is therefore of no great efficiency as a diffusible stimulant. It has, however, been recommended in cynanche maligna and scarlatina anginosa. As a gargle, it is much employed in the sore throat of scarlatina, and also as a cataplasm to cause counter-irritation. Dose of the *powder*, gr. v to gr. x, in pill; of the *tincture* (ʒi to diluted alcohol Oij), fʒi or fʒij; of the *infusion*, which is used also for a gargle, (ʒss to boiling water Oj), fʒss.

PIPER—BLACK PEPPER.

Black Pepper is the BERRIES of Piper Nigrum (*Nat. Ord.* Piperaceæ), a vine of the East Indies. The berries are gathered before they are quite ripe, and dried in the sun. They are wrinkled and black, in consequence of the drying of the pulp over the grayish-white seed, and in this state are known as *black* pepper. If permitted to ripen, and soaked in water till the outer coat is removed, they constitute *white* pepper. Pepper has an aromatic peculiar odour, and a hot, spicy, pungent taste. Its properties are taken up by alcohol and ether, and partially by water. It contains a volatile oil,

an acrid resin, and a peculiar neutral crystalline principle, called *piperin*, which has been used as an anti-intermittent remedy. Piperin is, however, of little efficacy, and owes its virtues to an admixture of the volatile oil.

Effects and Uses.—Pepper is a warm carminative stimulant, chiefly employed as a condiment; but it is also a useful stomachic, and a good adjunct to bark in the treatment of intermittent fevers. Dose, gr. v to gr. xx. An (ethereal) *fluid extract* is used in the dose of ℥i to ℥ij.

CINNAMOMUM—CINNAMON.

There are two varieties of cinnamon: Ceylon cinnamon, which is the BARK of Cinnamomum Zeylanicum (*Nat. Ord.* Lauraceæ), a tree of Ceylon and Java; and China Cinnamon, or Cassia, the BARK of Cinnamomum aromaticum (*Nat. Ord.* Lauraceæ), a tree of China. The most esteemed is the *Ceylon* cinnamon. To obtain this, the bark is peeled from branches which are three years old; the epidermis is afterwards scraped off; the smaller quills are introduced into the larger ones, and they are then dried in the sun and made into bundles. It is found in the shops in long, cylindrical pieces, which are very thin and smooth, of a yellow-brown colour, and a splintery fracture. It has a fragrant odour, and a warm, sweetish, aromatic taste. Its constituents are volatile oil, a little tannic acid, mucilage, an acid, resin, &c. The greater part, however, of the cinnamon brought to this country is the *Cassia* cinnamon. It has the general appearance, smell, and taste of true cinnamon. But its substance is thicker, its texture coarser, its fracture shorter, its colour darker, browner, and duller, and its flavour less sweet, and more pungent and bitter. Its properties are identical with those of the Ceylon variety.

Effects and Uses.—Cinnamon is an aromatic stimulant, with a slight astringency. It is used chiefly as a carminative, and

as an addition to other medicines. Dose, gr. x to ʒss; of the *tincture* (ʒiij, to diluted alcohol Oij), the dose is fʒj to ʒiij. A *compound tincture*, which contains also cardamoms and ginger, may be given in the same dose. *Oleum Cinnamomi* (*oil of cinnamon*), is of a light-yellow colour, which deepens by age. Dose one or two drops. *Aqua Cinnamomi* (*cinnamon water*), is prepared by rubbing up the oil with carbonate of magnesia, adding distilled water, and filtering. It is used as a vehicle for other medicines.

MYRISTICA—NUTMEG.

MACIS—MACE.

These products are portions of the fruit of Myristica moschata (*Nat. Ord.* Myristicaceæ), a tree of the Moluccas, cultivated also in Java and Sumatra. It bears a pyriform fruit, about the size of a small peach, which has a fleshy pericarp, opened by two longitudinal valves. Within this is the ARILLUS, a scarlet reticulated membrane, which, when dry, becomes yellow-brown and brittle, and is termed *mace*. The KERNELS of the fruit are the *nutmegs*. They are oval, of the size of an olive, with a hard, dark-brown, shining shell, marked by the mace; and to preserve them from the attacks of an insect, they are steeped in a mixture of lime and water. Mace has a pleasant, aromatic smell, and a warm, bitterish, pungent taste. Nutmegs have a delightfully fragrant odour, and a warm, aromatic, grateful taste.

Nutmegs contain a volatile oil, and by expression yield a fatty substance, known as "butter of nutmegs." From mace, also, a volatile oil is obtained by distillation.

Effects and Uses.—Nutmeg is one of the most agreeable of the aromatic stimulants, and is much employed for its carminative virtues, also as a flavouring ingredient, and to obviate the griping effects of cathartics. It is said to have nar-

cotic properties, and hence may be useful in bowel-complaints. Mace is chiefly employed as a condiment. Dose of either, ℈i to ʒss. *Oleum Myristicæ* (*oil of nutmeg*), is of a pale-straw colour. Dose, 2 or 3 drops. *Spiritus Myristicæ* is made by distilling nutmeg with diluted alcohol. Dose fʒi or fʒij.

CARYOPHYLLUS—CLOVES.

Cloves are the UNEXPANDED FLOWERS of Caryophyllus aromaticus (*Nat. Ord.* Myrtaceæ), an evergreen tree of the Moluccas. They are from five to ten lines long, and from one line to one and a half thick, the corolla forming a ball or sphere at the top, and the calyx a tapering, somewhat quadrangular base, resembling a nail, whence the common name, from the French, *clou*. When good, they are of a dark-brown colour, with a yellowish-red tint; they have a strong, fragrant odour, a hot acrid taste, and when pressed with the nail, should give out oil. They contain a volatile oil, tannic acid, resin, &c.; the oil consists of two oils, a heavy oil and a light oil.

Effects and Uses.—Cloves are among the most stimulating of the aromatics, but are chiefly used as a flavouring ingredient and as a condiment. Dose, gr. v to gr. x. The *infusion* (ʒij, to boiling water Oj) is a warm, grateful stomachic. The *oil, Oleum Caryophylli*, is pale, or yellowish, becoming darker by age. Dose, 2 to 6 drops.

PIMENTA—PIMENTO.

Pimento, called also *Allspice*, is the UNRIPE BERRIES of Myrtus Pimenta (*Nat. Ord.* Myrtaceæ), a handsome evergreen tree of the West Indies and South America. It consists of round, dull, roughish berries, rather larger than black peppercorns, with an external, hard, brittle shell, enclosing two dark-brown seeds. They have an aromatic, agreeable

smell, and a strong clove-like taste. They are principally used as a condiment. The *oil, Oleum pimentæ*, has a brownish-red colour. Dose, 3 to 6 drops. A *spirit* is made by dissolving the oil in diluted alcohol.

OLEUM CAJUPUTI—CAJEPUT OIL.—The volatile oil of the leaves of the Melaleuca Cajuputi (*Nat. Ord.* Myrtaceæ), a tree of the Moluccas, is a powerful diffusible aromatic stimulant, much employed in Eastern countries, and of late coming into use in the United States. It is a transparent oil, of a fine green colour, a lively penetrating odour, analogous to that of camphor and cardamom, and a warm, pungent taste. It is an admirable stomachic, for the relief of nausea, and is also used as an antispasmodic stimulant in low fevers, spasmodic cholera, &c. Dose, 1 to 5 drops.

OLEUM TEREBINTHINÆ—OIL OF TURPENTINE.

Oil of turpentine, commonly called *spirit of turpentine*, is obtained by distillation from the turpentine of Pinus palustris and other species of Pinus (*Nat. Ord.* Pinaceæ). When pure, it is a limpid, colourless, volatile, and inflammable liquid, of a strong, penetrating, peculiar odour, and a hot, pungent, bitterish taste. It is lighter than water, very slightly soluble in it, less soluble in alcohol than most other volatile oils, and readily soluble in ether.

Effects and Uses.—Oil of turpentine is stimulant, diuretic, blennorrhetic, and anthelmintic, and, externally, rubefacient. As a stimulant, it is a very valuable remedy in low forms of fever, particularly where the abdomen is tympanitic, and the bowels are ulcerated. It is employed also with advantage in morbid discharges from mucous membranes, hemorrhages, rheumatism, nervous disorders, atonic dropsy, gleet, nephritic and calculous affections, and as an anthelmintic in tænia. Enemata of the oil of turpentine are particularly serviceable

for the relief of tympanitis. Externally, it is used for purposes of counter-irritation.

Dose, as a stimulant or diuretic, five to thirty drops, repeated; as an anthelmintic or as an enema, f ʒss to f ʒij.

ZINGIBER—GINGER.

Ginger is the RHIZOMA of Zingiber officinale (*Nat. Ord.* Zingiberaceæ), a perennial, herbaceous plant, growing to the height of two or three feet, with long, lanceolate leaves, and yellow flowers. Its native country is unknown; but it has been cultivated in Asia from time immemorial, and was early introduced into the tropical regions of this country. Ginger root occurs in flattish, jointed, branched, or lobed palmate pieces, which rarely exceed four inches in length. In the young state, the roots are preserved in sugar, and form a very pleasant sweetmeat. When old, they are taken up, scalded in hot water, and dried, when they are known as *black ginger*. Sometimes they are scraped, previous to being dried, and are then called *white*, or *Jamaica ginger*. The former comes from the East Indies; the latter, from the West Indies. The powder of black ginger is yellowish-brown; that of white ginger, yellowish-white. Both varieties have a powerful, peculiar odour, and a warm, pungent, aromatic taste. They impart their virtues to water and alcohol, and contain a pale-yellow volatile oil, resin, starch, &c.

Effects and Uses.—Ginger is a pungent, aromatic stimulant, much employed as a stomachic in flatulency and spasm of the stomach and bowels. It is also used as a condiment, and to correct the unpleasant taste and nauseating qualities of other medicines. A paste made of the powder and warm water is used as counter-irritant. Dose, gr. x to gr. xx, in pill. An *infusion* (ʒss to boiling water Oj); a *tincture* (ʒviij to alcohol Oij); and a *syrup*, made from the tincture, are all used.

CARDAMOMUM—CARDAMOM.

Cardamom is the FRUIT of Elettaria Cardamomum (*Nat. Ord.* Zingiberaceæ), a perennial plant, from six to nine feet high, found in the mountainous parts of Malabar. Three varieties of Malabar cardamoms are known in commerce: *shorts*, *short-longs*, and *long-longs*, all furnished by the same plant. They are ovate-oblong, from three to ten lines long, coriaceous, ribbed, and of a grayish or brownish-yellow colour; and contain a number of blackish or reddish-brown seeds, which have a pleasant aromatic odour, and a warm, aromatic, agreeable taste. They yield a colourless volatile oil, a fixed oil, starch, &c.

Effects and Uses.—Cardamom is a very agreeable aromatic, devoid of acridity, and is much employed as a stomachic and carminative, and as an adjuvant and corrective of other medicines. Dose, gr. v–x. The *tincture* (℥iv to diluted alcohol Oij), is the preparation chiefly used. Dose, f℥i or f℥ij. The *compound tincture* contains also caraway, cinnamon, raisins, and cochineal.

Pulvis Aromaticus—Aromatic Powder,—consists of cinnamon and ginger, each two parts, cardamom seeds and nutmeg, each one part. Dose, gr. x to xxx.

CALAMUS—SWEET FLAG.

The RHIZOMA of Acorus Calamus (*Nat. Ord.* Orontiaceæ), an indigenous marshy plant, with long, sword-shaped radical leaves—is a valuable aromatic stimulant, with some tonic properties. It is found in the shops in somewhat flattened pieces, deprived of their epidermis, wrinkled, and of a yellowish colour, and has a strong, fragrant odour, and a warm, bitterish, aromatic taste. It contains volatile oil, resin, extractive, &c. *Dose*, ℈i to ʒi, or it may be given in infusion (℥i to boiling water Oj).

CALAMUS.

Fig. 13.

AURANTII CORTEX—ORANGE PEEL.

The OUTER RIND of the FRUIT of Citrus vulgaris, or Bitter

Orange, and Citrus Aurantium, or Sweet Orange (*Nat. Ord.* Aurantiaceæ), is much employed as a flavouring addition to other medicines.

GAULTHERIA—PARTRIDGE-BERRY.

Fig. 14.

Gaultheria procumbens, Partridge-berry, or Tea-berry (*Nat. Ord.* Ericaceæ), is a small indigenous evergreen plant, with one, and sometimes two reddish stems, a few inches in height, bright-green, obovate, coriaceous, serrulated leaves, and white, ovate, five-toothed flowers, followed by scarlet berries. The LEAVES are the officinal portion, and contain a very stimulant *volatile oil*, which, when first distilled, is colourless, but gradually becomes reddish. An infusion of the leaves, and an essence or alcoholic solution of the oil, are in very general popular use as carminatives and stomachics.

The following aromatics of the natural order, LAMIACEÆ, are pleasant carminatives and stomachics.

LAVANDULA—LAVENDER.—The FLOWERS of Lavandula vera, a small European shrub, cultivated in our gardens, about two feet high, with linear or lanceolate leaves, and purplish-gray flowers, which are gathered in June, and dried in the shade. They have an agreeable, fragrant odour, and a pungent bitter taste. The *oil*, which is of a pale-yellow colour, may be used in the dose of from 1 to 5 drops. But, the preferred preparations are the *Spirit* (*Spiritus Lavandulæ*), made by distilling the fresh lavender with alcohol and water, and the *Compound Spirit* (*Spiritus Lavandulæ Compositus*), which contains also spirit of rosemary, cinnamon, cloves, nutmeg, and red saunders. Dose, f℥i.

MENTHA PIPERITA—PEPPERMINT, and MENTHA VIRIDIS —SPEARMINT,—are European plants, naturalized in the United States. The HERBS of both are officinal, and have an aromatic odour, and a pungent, somewhat bitter taste, followed by a sensation of coolness. They contain volatile oils, with some bitter extractive, &c. One to five drops of the *oils* may be given; but they are usually administered in the form of *essence* or *tincture* (f℥ij to alcohol Oj), in the dose of 10 to 20 or 40 drops. A WATER is made by rubbing up either of the oils with carbonate of magnesia and water. The oil of peppermint is the stronger of the two.

ROSMARINUS—ROSEMARY.—The TOPS of Rosmarinus officinalis, or Rosemary, a European evergreen shrub, cultivated in our gardens, contain a very stimulant *volatile oil*, which is chiefly used as an ingredient of rubefacient liniments. A *spirit* is made by dissolving the oil in alcohol.

HEDEOMA—PENNYROYAL.—Hedeoma pulegioides, or Pennyroyal, is an indigenous annual plant, about a foot high, with oblong-lanceolate, serrated leaves, and small, pale-blue flowers, arranged in axillary whorls. The whole HERB is used, and

contains a light-yellow essential oil, similar in properties to the mint oils, but somewhat more powerful.

MONARDA—HORSEMINT.—The HERB of Monarda punctata, or horsemint, an indigenous plant. The essential oil is chiefly used as a rubefacient.

ORIGANUM.—The HERB of Origanum vulgare, or common Marjoram. The essential *oil* is an ingredient in stimulating liniments.

MARRUBIUM—HOREHOUND.—The HERB of Marrubium vulgare, possesses combined stimulant, tonic, and expectorant properties, and, in large doses, proves laxative. It is chiefly used in cough syrups and candies.

SALVIA—SAGE.—The LEAVES of Salvia officinalis, a European plant, cultivated in our gardens, are used as a condiment, and as a gargle in sore throat and relaxed uvula.

The following aromatic SEEDS are derived from plants of the natural order, Apiaceæ:

FŒNICULUM—FENNEL SEED,—the FRUIT of Fœniculum vulgare, a European plant, cultivated in our gardens. They may be used in infusion; the dose of the *oil* is 5 to 15 drops.

CARUM—CARAWAY,—the FRUIT of Carum Carui, a European plant, cultivated in this country. Dose of the *oil*, 1 to 10 drops.

ANISUM—ANISE,—the FRUIT of Pimpinella Anisum, originally a native of Egypt, but now cultivated throughout the South of Europe. Dose of the *oil*, 5 to 15 drops. The *oil* of the fruit of Illicium anisatum, or Star Anise, an evergreen tree of Japan and China, possesses analogous properties to those of oil of anise, and is much used as a substitute for it.

CORIANDRUM—CORIANDER,—the FRUIT of Coriandrum sativum, an annual plant of the South of Europe.

ORDER VII.—SEDATIVES.

Sedatives are medicines which diminish the force of the

action of the circulation, by depressing the nervous influence. Many narcotics, it has been seen, act as sedatives: as some of the solanaceæ, aconite, hydrocyanic acid, &c. But, under this head, are usually classed the medicinal substances which are employed therapeutically to reduce excitement of the vascular system.

With sedatives may be included also the medicinal agents, termed *refrigerants*, comprising nearly all the neutral alkaline salts, as well as those in which the acid predominates, and the vegetable acids. These substances have little power of diminishing the ordinary or healthy temperature, but they lower febrile heat, allay thirst, restore the secretions, and in this way are very useful adjuvants in the treatment of febrile complaints.

DIGITALIS—FOXGLOVE.

Digitalis purpurea, or Purple Foxglove (*Nat. Ord.* Scrophulariaceæ), is a biennial European plant, cultivated in our gardens, with an erect stem three or four feet high, large ovate-lanceolate, crenate, downy, and veiny leaves of a dull-green colour, and handsome bell-shaped crimson or purple flowers, arranged in a long terminal spike. The seeds and LEAVES both are active, but the latter only are employed; and those from the wild plants are preferred, as the cultivated variety is thought to be inferior in virtue. The petioles are removed, and the leaves are then dried in baskets, in a dark place, in a drying stove. When dried, they have a dull-green colour, with a faint odour, and a bitter, nauseous taste, and afford a fine deep-green powder. Both leaves and powder should be preserved in well-stoppered bottles, covered externally with dark-coloured paper, and kept in a dark cupboard. And, as their medicinal activity is impaired by keeping, they should be renewed annually. They contain a principle termed *digitalin*, which possesses similar properties to those of the leaves. It is white, inodorous, scarcely soluble in water, but

very soluble in alcohol, and has been employed in medicine, in doses of from 1-60th to 1-30th of a grain.

Physiological Effects.—The ordinary results of the administration of digitalis, in *small and repeated doses*, are an increase in the secretion of urine and a reduction of the frequency and force of the pulse, sometimes accompanied by nausea; but these effects are not constant. The influence of digitalis over the pulse is more marked in weak and debilitated persons, than in those who are robust and plethoric. Its effects, too, in this particular, are more easily obtained in the recumbent than in the erect posture, owing to the less force required in the former position, to carry on the circulation. In the repeated use of small doses of this medicine, a *cumulative effect* is sometimes observed: its powers are not manifested for a certain time, and effects are suddenly produced, which are attributable to the whole amount administered, giving rise to dangerous and even fatal syncope. When too long continued, or taken in *excessive doses*, digitalis acts as an acro-narcotic poison, producing effects similar to those of tobacco, lobelia, &c. In such cases, after evacuating the stomach, the diffusible stimuli, as brandy and carbonate of ammonia, should be administered. The quantity of digitalis, however, that may be given, without destroying life, is considerable.

Medicinal Uses.—From its sedative action on the circulation, digitalis has been used in fevers, inflammations, and hemorrhages, where blood-letting is inadmissible, as in hectic fever, tubercular hemoptysis, &c. In the treatment of diseases of the heart and great vessels, it is a remedy of the greatest value, to reduce the force and frequency of the circulation. From its action on the kidneys, it is greatly esteemed in the treatment of dropsy; and in the varieties of this disorder, resulting from heart disease, it is more employed than any other remedy, from its combined sedative and diuretic influence.

Administration.—Digitalis is best given in *powder*, of which the dose is gr. i, two or three times a day, to be gradually increased. An *infusion* is officinal (ʒj to boiling water Oss, with tincture of cinnamon fʒj); but water is a bad solvent. The *tincture* (ʒiv, to diluted alcohol Oij), is a better preparation. Dose, 10 to 20 drops, two or three times a day, to be gradually increased.

ANTIMONII PRÆPARATA—PREPARATIONS OF ANTIMONY.

ANTIMONII ET POTASSÆ TARTRAS—TARTRATE OF ANTIMONY AND POTASSA.—This valuable salt, familiarly known as *tartar emetic*, is prepared by boiling water and cream of tartar with teroxide of antimony. It occurs in colourless, transparent, rhombic, octohedron crystals, which become white and opaque from efflorescence on exposure to the air. When pure, its powder is perfectly white; but it is to be preferred in the crystalline state, as in this form it is less liable to adulteration. When dropped into a solution of hydrosulphuric acid, the crystals should have an orange-coloured deposit formed on them. The powder is sometimes adulterated with cream of tartar, which may be detected by adding a few drops of a solution of carbonate of soda to a boiling solution of the antimonial salt, and if the precipitate formed be not dissolved, no bitartrate of potash is present.

Tartar emetic consists of 1 equiv. of tartaric acid, potash, and teroxide of antimony, each, with 3, or perhaps 2 equiv. of water of crystallization. It is inodorous; has a nauseous, metallic taste; is very soluble in water; insoluble in pure alcohol; and is decomposed by the pure alkalies, alkaline carbonates, and the vegetable astringents.

Physiological Effects.—Tartar emetic is a powerful *local* irritant. Applied to the skin, it occasions an eruption of pustules, resembling those of variola or ecthyma. When taken into the stomach, in full doses, it causes vomiting, purging, griping pains, &c.; and, in excessive quantity, it acts as

an irritant poison, and has even produced death: very large doses have, however, of late years, been given medicinally with entire safety. The proper *antidote* is tannic acid; and opium and demulcents should be also administered. The *constitutional* effects of tartar emetic, when taken internally, in small doses, are an increase in the secretions and exhalations generally, especially from the skin; in somewhat larger doses, these effects are accompanied with nausea and vomiting, relaxation of the tissues (particularly the muscular fibres), a feeling of great feebleness and exhaustion, and a powerful sedative action on the circulation and respiration.

Medicinal Uses.—Tartar emetic is employed therapeutically as an emetic, nauseant, sedative, sudorific, and expectorant, and locally as a counter-irritant. As an *emetic*, it creates more nausea and depression than any other substance; and hence, while other emetics are to be preferred to it, when our object is merely to evacuate the contents of the stomach with as little constitutional disturbance as possible, it is of the greatest value, when vomiting is resorted to as a means of making an impression on the system, and thereby checking the progress of disease. As a *nauseant*, tartar emetic is employed to relax the muscular system in the reduction of dislocations, strangulated herniæ, &c. As a *sedative antiphlogistic*, in large doses, it is a most powerful and valuable remedy in the treatment of acute inflammation, with fever, from its combined action in reducing the force of the circulation, moderating the heat of skin, and promoting diaphoresis. In the treatment of pneumonia, it has long been extensively resorted to—by some practitioners even to the exclusion of blood-letting. From gr. $\frac{1}{4}$ to gr. $\frac{1}{2}$ may be given every two hours, in gradually-increasing doses, until some amelioration of the symptoms takes place, when the doses are to be again decreased. As a *diaphoretic*, it is very useful, in small doses (as from gr. $\frac{1}{16}$ to gr. $\frac{1}{4}$, repeated), in continued fevers, in-

flammation from wounds, injuries, &c.; and as an *expectorant*, in the same doses, it is employed in various pulmonary affections, with advantage. As a *local irritant*, it is applied to the skin in the form of aqueous solution, ointment, or plaster, in chronic diseases of the chest, affections of joints, &c.

Administration.—The dose of tartar emetic, as an *emetic*, is gr. i or ij, and it is frequently combined with ipecacuanha. As a *sedative antiphlogistic*, gr. ¼ or ½, to gr. i or ij; as a *nauseant*, gr. ¼ to ½; and as a *diaphoretic and expectorant*, gr. $\frac{1}{16}$ to ¼, —may be given in solution, and in each case repeated every two or three hours. For external use, the *ointment* (*unguentum antimonii*, ʒij, to lard ʒi), may be employed.

Vinum Antimonii—Antimonial Wine,—is a solution of tartar emetic (℈i) in white wine (fʒx). It is employed as an expectorant and sudorific, in the dose of from 10 to 30 drops, frequently repeated; and as an emetic for children, in the dose of 30 drops to fʒi, repeated every quarter of an hour.

Antimonii Sulphuretum Præcipitatum — Precipitated Sulphuret of Antimony,—is prepared by boiling the native tersulphuret of antimony with a solution of potassa, and adding diluted sulphuric acid to the strained solution; the sulphate of potassa which is formed, being afterwards washed away with hot water. It is a reddish-brown, odourless, almost tasteless, insoluble powder, and is chemically a mixture of teroxide and tersulphuret of antimony. Its effects are analogous to those of tartar emetic, but it is chiefly employed as an *alterative* in cutaneous affections, secondary syphilis, &c., usually in conjunction with mercurials. *Dose*, as an *alterative*, gr. i to iij; as an emetic, gr. v to xx.

Kermes Mineral is another mixture of tersulphuret and teroxide of antimony, prepared by boiling tersulphuret with an alkaline carbonate or caustic solution. It is an odourless, tasteless, brownish-red, insoluble powder, sometimes employed as an antiphlogistic in pneumonia; but it is uncertain in its

operation, and probably possesses no advantages over tartar emetic. Dose, gr. ½ to gr. ij, or iij.

By the addition of an acid to the liquor which remains after the precipitation of kermes, an orange-red, odourless, tasteless powder, called *golden sulphuret* of antimony, is obtained. It is a mixture of tersulphuret and teroxide with some free sulphur, and resembles the last two preparations in its medicinal properties. Dose, gr. ½ to gr. ij, or iij.

Pulvis Antimonialis Compositus.—An antimonial powder is prepared in imitation of the celebrated *James's powder*, by burning sulphuret of antimony with hartshorn shavings or bone shavings. It is a white, gritty, tasteless, odourless powder, consisting of a mixture of antimonious acid and phosphate of lime, with some teroxide of antimony and a little antimonite of lime. It was formerly much employed in fevers; but it is unequal in its operation, owing its activity to the teroxide of antimony present. Hence, it has been dismissed from the U. S. Pharmacopœia. Dose, gr. iij to viij.

REFRIGERANTS.

POTASSÆ NITRAS—NITRATE OF POTASSA.

This salt, commonly called *nitre* and *saltpetre*, occurs in both the inorganized and organized kingdoms of nature. It is obtained, for medicinal use, principally by the purification of the native nitre of India; and it is also found in *saltpetre caves* in various parts of the United States, associated with nitrate of lime, from which it is separated by lixiviation. It is also artificially produced in several parts of Europe, in nitre beds or saltpetre plantations, by bringing together decayed organic nitrogenized matters and marl, chalk, mortar, &c. It is found in the shops in large, transparent, colourless crystals, of the form of six-sided prisms with dihedral summits. They have no odour, a sharp, cooling taste, are soluble in water, and in-

soluble in pure alcohol. They have no water of crystallization, but frequently have a portion of the mother liquid mechanically lodged in the spaces of the crystals, which may be driven off by heat, and the salt fused and cast into moulds.

Physiological Effects.—In *excessive doses*, nitre may act as a fatal poison, producing irritation of the alimentary canal and derangement of the nervous system. There is no antidote for it; and cases of poisoning are to be treated by demulcents, opiates, &c., after evacuation of the contents of the stomach. In *moderate doses*, it is refrigerant, sedative, diuretic, and diaphoretic, and, in large or continued doses, laxative. Its refrigerant properties are best seen when the body is morbidly hot, as in fevers. When mixed with the blood, after absorption, it produces several chemical changes, the most important of which is an *antiplastic* effect, by impeding coagulation.

Medicinal Uses.—Nitre is a very valuable refrigerant and sedative remedy in fevers, inflammations, hemorrhages, &c. In fevers, it is often prescribed with calomel and tartar emetic, under the name of *nitrous powders*. In large doses, it was given formerly in acute rheumatism, and this practice has been lately revived with success in France. It has also been given in large doses with advantage in the treatment of scurvy; and, with other alkaline salts, has been employed in malignant cholera. *Dose*, gr. x to ʒss. From ʒiv to ʒvi, are given in 24 hours, in acute rheumatism, and the quantity is increased to ʒviij, x, or xij.

POTASSÆ CITRAS—CITRATE OF POTASSA.

This salt is made by saturating a solution of citric acid with bicarbonate of potassa, and evaporating to dryness. It is white, granular, deliquescent, and very soluble in water. It is an excellent refrigerant diaphoretic, much employed in febrile affections. *Dose*, gr. xx–xxv; ʒvi are usually dissolved in water Oss, and fʒss of the solution is administered every hour or two.

Liquor Potassæ Citratis—Solution of Citrate of Potassa, or *Neutral Mixture*,—is made by saturating fresh lemon-juice with bicarbonate of potassa; or, when the lemon juice cannot be had, a solution of citric acid, flavoured with oil of lemons, may be used as a substitute. This preparation contains some free carbonic acid, which renders it more grateful to an irritable stomach than the ordinary solutions of the citrate. Under the name of *effervescing draught*, the citrate of potassa is often prepared extemporaneously and given in the state of effervescence.

LIQUOR AMMONIÆ ACETATIS—SOLUTION OF ACETATE OF AMMONIA.

This solution, termed also *Spiritus Mindereri*, or *Spirit of Mindererus*, is made by saturating diluted acetic acid with carbonate of ammonia. When pure, it is a colourless liquid, with a saline taste. In small doses, it is refrigerant; in larger doses, diaphoretic, diuretic, and perhaps resolvent. It is employed in febrile and inflammatory affections, sometimes in conjunction with nitre or tartar emetic, sometimes with camphor and opium. *Dose*, f℥ss to f℥i, every two, three, or four hours, in sweetened water.

SPIRITUS ÆTHERIS NITRICI—SPIRIT OF NITRIC ETHER.

This preparation, commonly known as *Sweet Spirit of Nitre*, is a mixture of hyponitrous ether and alcohol. It is obtained by distilling sulphuric acid with a mixture of nitre and alcohol, and is a colourless, volatile, inflammable liquid, soluble in water and alcohol, of a fragrant, ethereal odour, and a pungent, aromatic, sweetish, acidulous taste.

Effects and Uses.—Sweet Spirit of Nitre is refrigerant, diaphoretic, and diuretic. It is much used in febrile affections, and, from its diuretic properties, is often combined with other diuretics in the treatment of dropsies. *Dose*, f℥ss to f℥i, frequently repeated.

ACIDA VEGETABILIA—VEGETABLE ACIDS.

Most of the vegetable acids are refrigerant, and when properly diluted, form useful drinks in fevers, &c. Those chiefly employed are *acidum aceticum* (*acetic acid*), and *acidum citricum* (*citric acid*). Citric acid may be agreeably administered in the juice of lemons, limes, sour oranges, and tamarinds. When these cannot be obtained, a solution of citric acid (℈i to water Oi), may be substituted. Citric acid is manufactured from lemon or lime juice, by saturating it with carbonate of lime, and afterwards decomposing the citrate of lime, which is formed, by the addition of sulphuric acid. It occurs in colourless crystals, having the form of rhomboidal prisms, with dihedral summits, freely soluble in water, and soluble in alcohol; ʒixss, added to distilled water Oi, form a solution of the average strength of lemon-juice. In the dose of f℥i every fourth hour, lemon-juice has lately been employed with much success in acute rheumatism. Properly diluted and mixed with sugar, it forms the delightful refrigerant known as lemonade.

ORDER VIII.—SPASTICS.

Under the term Spastics (from σπασις, spasm), are comprised medicines which excite muscular contraction or spasm. To this class belong vegetable substances containing the alkaloids strychnia and brucia, which are employed therapeutically in torpid or paralytic conditions of the muscular system—and ergot, which is used to excite muscular contractions of the uterus.

NUX VOMICA.

Strychnos Nux vomica, or Poison-Nut (*Nat. Ord.* Loganiaceæ), is a middling-sized tree of the coast of Coromandel and other parts of India, which bears a round, smooth berry,

the size of a pretty large apple, of a rich orange colour, and containing numerous seeds embedded in a juicy pulp. The SEEDS are the officinal portion; but the bark also is poisonous, and is known as *false angustura bark*, from its having been confounded with angustura bark. The seeds are round, peltate, less than an inch in diameter, nearly flat, or convex on one side and concave on the other, and surrounded by a narrow annular stria. They have two coats: a simple, fibrous, outer coat, covered with short, silky hairs, of a gray or yellowish colour, and a very thin inner coat, which envelops the nucleus or kernel. This is hard, horny, of a whitish or yellowish colour, and of very difficult pulverization. The seeds have no odour, but an intensely bitter taste, which is stronger in the kernel than in the investing membrane. They impart their virtues to water, but more readily to diluted alcohol, and contain two active *alkaloid* principles, *strychnia* (which is officinal), and *brucia*, both of which exist in combination with an acid called strychnic, or igasuric.

Physiological Effects.—In very small and repeated doses, nux vomica has a tonic and diuretic effect, and sometimes operates slightly on the bowels and skin. In somewhat larger doses, the stomach is often disturbed; and in still larger doses, the muscular system becomes disordered. A sense of weight and weakness in the limbs, and increased sensibility to external impressions of all kinds, manifest themselves, with depression of spirits and anxiety; the limbs tremble, and slight convulsive movements of the muscles appear. If the medicine be continued, convulsive paroxysms of the whole muscular system ensue, with erotic desires, painful sensations in the skin, and occasionally eruptions: the pulse is not much affected. In paralytic patients, the effects of the medicine are principally observed in the paralysed parts. When taken in excessive doses, it produces tetanus, asphyxia, and death. There is no antidote, unless, perhaps, tannic acid; after

evacuating the stomach, antispasmodic narcotics, as opium, conium, ether, chloroform, &c., may be exhibited.

Medicinal Uses.—This medicine is our chief resource in torpid or paralytic conditions of the motor or sensitive nerves, or of the muscular fibre. When, however, paralysis is the result of inflammation of the nervous centres, it is injurious and accelerates organic changes. It is most beneficial in those forms of paralysis, which are independent of structural lesion, as lead palsy. In paralysis, arising from cerebral hemorrhage, — after the absorption of the effused blood, and the paralysis remains, as it were, from habit—the cautious employment of nux vomica is often attended with advantage. In amaurosis, free from cerebral complication, it is sometimes useful; and it is occasionally serviceable in other nervous affections. It has also been found beneficial in impotence, incontinence of urine, and spermatorrhœa; and, in small doses, it has been used as a tonic in dyspepsia.

Administration.—Dose, of the *powder*, gr. ij or iij, in pill, several times a day, and increased till an effect is produced; of the *extract* (alcoholic), gr. ½ to gr. i, to be repeated and increased; of the *tincture* (℥viij to alcohol Oij), gtt. v to xx, and this is sometimes used as an embrocation to paralysed parts.

STRYCHNIA is obtained by the following process:—Nux vomica is digested and boiled in water acidulated with muriatic acid, and the resulting muriate of strychnia and brucia is decomposed by lime. The strychnia is separated from brucia and impurities, by boiling alcohol, from which it is deposited when cool, the brucia being left in solution. It is then converted into a sulphate by the addition of diluted sulphuric acid, next decolorized by animal charcoal, and again precipitated by solution of ammonia. Thus obtained, it is in the form of a white powder, of an intensely bitter taste, almost insoluble in water, slightly soluble in cold alcohol, but readily soluble in boiling alcohol. Its effects are similar to those of

nux vomica, but more violent; its local action is that of an irritant. It is employed for the same purposes as nux vomica, and should be given in very minute doses, as gr. $\frac{1}{12}$ to begin with, to be gradually increased and repeated. The salts of strychnia may be also employed in the same doses, but they are more soluble, and therefore more active. For *endermic* use, gr. ½ of strychnia may be used.

The SEEDS of *Ignatia Amara*, or the *Bean of St. Ignatius*, a tree of the Philippine Islands, contain a large proportion of strychnia, but are not employed in this country.

TOXICODENDRON—POISON-OAK.—The LEAVES of Rhus Toxicodendron, or Poison-Oak (*Nat. Ord.* Anacardiaceæ), an indigenous shrub from one to three feet high, and other species of Rhus, possess properties somewhat analogous to those of Nux vomica, and have been employed with success in paralysis. *Dose*, gr. ½ to gr. i, or more, to be repeated and increased.

ERGOTA—ERGOT.

The term ergot is applied to the DISEASED SEEDS of Secale cereale, or Rye (*Nat. Ord.* Graminaceæ). The disease is the result of the presence of a parasitical fungus—the first appearance of which is observed, by the young grain and its appendages becoming covered with a white coating composed of multitudes of sporidia, mixed with cobweb-like filaments. Its predisposing cause is unknown, and it is not peculiar to rye, many other grasses being subject to it. When mature, the ergot projects beyond the envelopes of the grain, has a violet-black colour, and presents scarcely any filaments and sporidia. As found in the shops, it consists of cylindrical, or somewhat prismatical tapering grains, curved like the spur of a cock, of a purplish colour externally, and of a yellowish or grayish-white colour within. Its smell is peculiar and nauseous;

its taste is at first faint, but becomes bitterish, acrid, and disagreeable. It contains a poisonous principle, termed ergotin, which is insoluble in water, and is not the agent which acts on the uterus; and a reddish-brown *oil*, which possesses the same influence over the uterus as ergot, and is employed medicinally in doses of from twenty to fifty drops.

Physiological Effects.—The effects of ergot, in medicinal doses, are unimportant on the male system. On the female, it excites powerful contraction of the uterus. *After labour has commenced*, in ten or twenty minutes from its administration, it increases the violence, frequency, and continuance of labour pains, which usually never cease until the child is born. Administered *before labour*, it frequently originates the process, though its effects in this respect are less constant. And even on the *unimpregnated uterus*, it produces painful contractions, and evinces an influence over morbid conditions of the organ, by checking uterine hemorrhage, and expelling polypi. In large doses, it acts as an acro-narcotic poison on both sexes. When it is used for a length of time as an article of food, it produces a peculiar morbid condition, termed ergotism, which assumes two forms,—one attended with convulsions, the other with dry gangrene of the limbs.

Medicinal Uses.—The chief employment of ergot is to promote the action of the uterus in parturition, when its expulsatory efforts are feeble and inefficient. It is, however, admissible only when there is a *proper conformation of the pelvis and soft parts*, when the os uteri, vagina, and os externum are dilated, or readily dilatable, and when the presentation of the child is such as to offer no great mechanical impediment to delivery. It is also useful—when from any cause it is important to accelerate delivery; to promote the expulsion of the placenta, when it is retained from a want of contraction of the uterus; to expel clots, hydatids, polypi, &c.; to restrain uterine

hemorrhage, whether puerperal or non-puerperal; to excite and promote abortion, &c.; and sometimes as a styptic.

Administration.—Dose, of the *powder*, ℈j, every twenty minutes, till its effects are produced, or three doses are taken; of the *wine, vinum ergotæ* (℥ij, to white wine Oj), f℥i to f℥ii, repeated as above.

EXTRACTUM CANNABIS—EXTRACT OF HEMP.—(See p. 56). This is said to possess the power of increasing the force of uterine contraction during labour.

CLASS II.—ECCRITICS.

ORDER I.—EMETICS.

Emetics (from ἐμέω, I vomit), are medicines which are employed to promote vomiting; when they are used merely to excite nausea, they are termed *nauseants.* When an emetic is administered, usually within fifteen or twenty minutes afterwards, a feeling of nausea, relaxation, and faintness is experienced, with coolness and moisture of the skin, and a small, feeble, irregular pulse. These symptoms increase, till the contents of the stomach are ejected. During the act of vomiting, the face becomes flushed, the pulse is full and frequent, and the temperature of the body is increased. After vomiting is over, the skin is moist, the pulse soft and feeble, the patient becomes languid and drowsy, and, under peculiar circumstances, alarming and even fatal syncope has been induced. Vomiting is a reflex spinal act. Dr. Marshall Hall gives the following summary of its mechanism: "During the act of vomiting, 1, the larynx is closed; 2, the cardia is opened; and 3, all the muscles of expiration are called into action; but 4, actual expiration being prevented by the closure of the larynx, the force of the effort is expended upon the stomach, the cardia being open, and vomiting is effected."

Susceptibility to the action of emetics differs in different individuals and in different diseases. In fevers, and where gastric irritation is present, their influence is increased; and, on the other hand, when the brain is oppressed by disease or by narcotic medicines, the stomach is exceedingly insensible to their action.

Emetics are employed therapeutically: 1, to evacuate the stomach, for the purpose of removing poisons, undigested food, &c.; and with this view, the emetics should be selected which occasion least nausea and distress; 2, to expel foreign bodies lodged in the throat or œsophagus; 3, to excite nausea, and thereby depress the vascular and muscular systems; 4, to relieve spasm, as in spasmodic croup; 5, to promote secretion and excretion, &c.; and 6, sometimes to break up a train of morbid association, by giving a shock to the system. They are improper in congestion of the brain, pregnancy, hernia, &c. The act of emesis is promoted by the free use of tepid drinks; excessive vomiting may be checked by demulcents, opiates, counter-irritation to the stomach, &c.

VEGETABLE EMETICS.

IPECACUANHA.

Ipecacuanha is the ROOT of Cephaëlis Ipecacuanha (*Nat. Ord.* Cinchonaceæ), a small shrubby perennial plant of Brazil, where it grows to the height of about five or six inches. The roots, as met with in the shops, are in pieces about the size of a quill, several inches long, of an irregular, twisted, contorted shape, with numerous circular rings or rugæ, from which they have been termed *annulated*. When broken, they are seen to consist of two distinct parts,—a thin ligneous axis or centre, which is nearly inert, and a thick cortical layer, of a brownish, reddish, or gray colour, and resinous fracture, which has an herbaceous, acrid, rather bitter taste, and a

slightly nauseous odour. The powder is of a light grayish-fawn colour, and has a peculiar nauseous odour, which in some persons excites violent sneezing, in others dyspnœa. Ipecacuanha imparts its virtues to both water and alcohol, but they are injured by decoction. Its emetic property depends on the presence of a peculiar alkaline principle, termed *emetia*, a whitish, inodorous, slightly bitter substance, sparingly soluble in water, and very soluble in alcohol. It produces vomiting in the dose of gr. ½, and in over-doses, may occasion dangerous and even fatal symptoms.

Effects and Uses.—In full doses, ipecacuanha is a mild and certain emetic, well adapted to the treatment of spasmodic croup in children, and to all cases where a simple evacuation of the stomach is desired. In smaller doses, it produces nausea, depression of the pulse, expectoration, and diaphoresis, and with these views it is employed in the treatment of pulmonary affections, dysentery, and inflammatory disorders generally. In still smaller doses, it is useful as a tonic and alterative.

Administration.—Dose, as an *emetic*, gr. xv to gr. xx, often combined with a grain of tartar emetic; as an *expectorant* or *diaphoretic*, gr. ss to gr. ij, three or four times a day; as an *alterative*, gr. ¼ to gr. ½, repeated. *Vinum Ipecacuanhæ* (ʒj to white wine Oj)—dose, as an *emetic*, f ʒj, as an *expectorant* and *diaphoretic*, ♏x, to xxx; *Syrupus Ipecacuanhæ* is an excellent preparation for children—f ʒj contains gr. xv of ipecacuanha; for a child a year or two old, f ʒj or ij, may be given as an *emetic*, and ♏v to xx, as an expectorant. *Pulvis Ipecacuanhæ et Opii, Powder of Ipecacuanha and Opium*, or *Dover's Powder* (see Opium, p. 41).

GILLENIA.

Gillenia trifoliata, Indian Physic, or American Ipecacuanha (*Nat. Ord.* Rosaceæ), is an indigenous herbaceous plant, with a perennial root, consisting of a number of fibres, arising

from a tuber; one or more stems, two or three feet high, of a reddish-brown colour; trifoliate leaves; and white flowers, with a tinge of red. West of the Alleghany Mountains, another species, G. stipulacea, is found, which is identical with the trifoliata in its properties, and is distinguished from it by having its lower leaves pinnatifid. The officinal portion of both is the ROOT. As found in the shops, it consists of pieces not thicker than a quill, wrinkled, of a reddish-brown colour, and composed of an easily separable and pulverizable cortical portion, and a comparatively inert internal ligneous cord, which should be rejected. The bark has a feeble odour, and a nauseous, bitter taste, and makes a light-brownish powder.

Effects and Uses.—Gillenia is a safe and efficacious emetic, resembling ipecacuanha in its action, and like it, in small doses proves a useful diaphoretic, expectorant, tonic, &c. Dose, as an *emetic*, gr. xxx; as an *expectorant* or *diaphoretic*, gr. ij to iv; and as a *tonic*, gr. i.

SANGUINARIA—BLOODROOT.

The RHIZOMA of Sanguinaria Canadensis, or Bloodroot (*Nat. Ord.* Papaveraceæ), a small indigenous plant, with radical, cordate, lobate leaves, and a handsome, white, eight-petaled flower, which appears in early spring—is usually classed with emetics. When dried, it is in flattened pieces, much wrinkled and contorted, of a reddish-brown colour, with a faint narcotic odour, and a bitterish, very acrid taste. It yields its virtues to water and alcohol, and loses them rapidly by keeping. An active alkaline principle, *sanguinarina*, has been obtained from it, which possesses the properties of the root.

Effects and Uses.—Bloodroot is an acrid emetic, and in large doses, an acro-narcotic poison. Locally, it acts as an irritant, and upon fungous surfaces as an escharotic. It is not much used as an emetic; but is occasionally employed with this view, or as a nauseant, in pulmonary affections.

Fig. 15.

Dose, as an emetic, gr. x to xx, in pill; or in infusion (ʒss to boiling water Oj), of which fʒss is the dose. *Tincture* (ʒiv to diluted alcohol Oij)—dose, fʒiij or iv. It is also employed externally, dissolved in vinegar.

EUPHORBIA COROLLATA—LARGE FLOWERING SPURGE.

Fig. 16.

EUPHORBIA IPECACUANHA—IPECACUANHA SPURGE.—The ROOTS of these indigenous plants (*Nat. Ord.* Euphorbiaceæ), possess emetic properties; but they are apt to operate on the bowels, and, in over-doses, prove extremely violent. Dose, gr. x to xv.

SINAPIS—MUSTARD.—The SEEDS of Sinapis nigra and Sinapis alba (*Nat. Ord.* Brassicaceæ), in doses of from a tea-

spoonful to a tablespoonful, are very useful emetics, particularly in atonic conditions of the stomach.

TOBACCO and LOBELIA act as emetics in large doses, but their employment is attended with danger, owing to the great prostration which they produce (see pp. 48, 50). SQUILL also possesses emetic powers, but it is too irritating for use in this respect.

MINERAL EMETICS.

TARTAR EMETIC. Dose, gr. i or gr. ij (see p. 150).
SULPHATE OF ZINC. Dose, gr. x to gr. xx (see p. 106).
SULPHATE OF COPPER. Dose, gr. iij to gr. v (see p. 105).
ALUM. Dose, a teaspoonful (see p. 129).

ORDER II.—CATHARTICS.

Cathartics (from καθαίρω, I purge), termed also *purgatives*, are medicines which produce evacuations from the bowels. Some operate by increasing the peristaltic motion of the intestines; others stimulate the mucous follicles and exhalants, and occasion watery evacuations, whence they are termed *hydragogues*. The more violent of the hydragogues, if given in overdoses, produce inflammation of the alimentary canal, characterized by violent vomiting and purging, abdominal pain and tenderness, cold extremities, and sinking pulse. From their activity, they are denominated *drastics*. Different cathartics affect different parts of the alimentary canal unequally, some acting more particularly on the upper portion, some on the lower, and others affecting all parts equally. Mercurial preparations purge chiefly by inducing a flow of bile from the liver.

Cathartics may be arranged into five groups:—1. *Laxatives*, which gently evacuate the contents of the bowels, without causing any obvious irritation or affecting the general system. 2. *Saline Cathartics*, which increase both the peri-

staltic action of the bowels and the effusion of fluids from the mucous surface, but are devoid of any stimulant action on the general system, and are therefore adapted to the treatment of febrile and inflammatory cases. 3. *Mild acrid cathartics*, which are acrid and stimulant, but not sufficiently violent in their local action to cause inflammation. 4. *Drastics*, comprising the more powerful and irritating cathartics, which, in large doses, act as acrid poisons. 5. *Mercurial* cathartics.

Cathartics are employed *therapeutically*:—1. To evacuate the bowels and remove noxious matters, as retained feces, undigested food, morbid secretions, worms, poisons, &c. 2. To relieve inflammation, congestion, and plethora, by the depletion of the blood-vessels, which results from increased secretion and exhalation from the gastro-intestinal canal. 3. To promote absorption. 4. To affect remote organs, particularly the brain, through the agency of revulsion and counter-irritation. 5. To stimulate the secretion of the liver and pancreas, by irritating the orifice of the ductus communis choledochus. 6. To restore the catamenia, by the irritating or stimulating influence which they exert on the pelvic vessels. The more active cathartics are contra-indicated in cases of inflammation or ulceration of the gastro-intestinal mucous membrane, peritonitis, the advanced stages of typhoid fever, pregnancy, &c.

The operation of cathartics is promoted by the addition of small doses of emetics, and of the bitters. By combining those which act upon different portions of the alimentary canal, their operation is rendered less irritant, without any diminution of purgative efficiency. The griping and nauseating tendency of the drastic cathartics may be corrected by the addition of aromatics; carbonic acid water is a grateful vehicle for administering the saline preparations. Cathartics operate most speedily and favourably when given on an empty stomach, and susceptibility to their action is diminished during sleep, and increased by exercise. Mild diluent beverages

promote their operation. In the event of hypercatharsis, opium should be administered by the mouth or rectum.

LAXATIVES.

Several articles of diet have a laxative operation on the bowels, and are useful in cases of habitual costiveness, as most of the ripe and dried fruits—particularly tamarinds, peaches, apples, raisins, figs, and prunes,—West India molasses, honey, oatmeal, bran, &c.

The following medicinal substances are usually arranged under the head of *laxatives*, and are employed in cases where we wish to open the bowels with the least possible irritation,—as in children and pregnant women, in inflammations or surgical operations about the abdomen and pelvis, in hernia, piles, affections of the rectum or womb, &c.

MANNA.

Manna is the CONCRETE JUICE of Ornus Europæa, or Flowering Ash (*Nat. Ord.* Oleaceæ), a small tree of the South of Europe. It is obtained from incisions into the stems of the trees. The best kind is produced during the height of the season, when the juice flows vigorously, and from the upper stems, where it is less fatty. It is called *flake manna*, and consists of pieces from one to six inches long, one to two inches wide, and from half an inch to an inch thick, of irregular form, but more or less stalactitic, hollowed out on one side (from the shape of the tree or substance on which they are concreted), of a white or yellowish-white colour, an odour like that of honey, and a sweet, afterwards rather acrid taste. A commoner manna, called *manna in sorts*, is obtained from incisions later in the season, and from the lower stems. It occurs in small pieces, which seldom exceed an inch in length, and are softer, more viscid, and darker than the flake manna. A still inferior variety is termed *fatty manna*, and consists of small, soft,

viscid fragments, of a dirty yellowish-brown colour, mixed with a few pieces of the flake manna. Manna is soluble in both water and alcohol, and contains a white, crystalline, saccharine principle, termed *mannite*, some sugar, and a resin, to which it probably owes most of its purgative effect.

Effects and Uses.—In moderate doses, manna is nutritive; in larger, mildly laxative. It is principally given to children, to whom its sweet taste renders it acceptable; and it is sometimes combined with the more active cathartics. It may be taken in substance, or dissolved in warm milk or water. Dose for an adult, ʒi to ʒij; for children, ʒi to ʒiij.

OLEUM OLIVÆ—OLIVE OIL.—The well-known OIL obtained from the FRUIT of Olea Europæa, or Olive Tree (*Nat. Ord.* Oleaceæ), is nutritive, demulcent, emollient, and laxative. It is frequently prescribed as a constituent of laxative enemata.

CASSIA FISTULA—PURGING CASSIA.

This is the FRUIT of Cassia Fistula (*Nat. Ord.* Fabaceæ), a large tree of Egypt and the East Indies, now naturalized in the West Indies and South America. It consists of long, woody, dark-brown pods, about an inch in diameter, and nearly two feet in length, which contain numerous seeds embedded in a soft black pulp. The PULP is the part used, and has a faint nauseous odour, and a sweet, rather pleasant mucilaginous taste. It is, in small doses, a mild, agreeable laxative, but its chief use is as an ingredient in the *Confection of Senna*. *Dose*, ʒi to ʒi.

OLEUM RICINI—CASTOR OIL.

Castor oil is the OIL of the SEEDS of Ricinus communis, or Palma Christi (*Nat. Ord.* Euphorbiaceæ), a small perennial tree of India, now naturalized in many warm climates, and cultivated extensively in the United States. In this country, it is an annual plant, about 5 or 6 feet in height, with round,

thick-jointed, furrowed stems, of a purplish colour above; large peltato-palmate leaves, divided into 7 or 9 segments, on long round footstalks; and prickly, three-celled capsules, with a seed in each cell. The seeds are ovate, about the size of a small bean, and of a gray colour, marbled with reddish-brown spots and stripes. They possess considerable acridity, and, in large quantities, have produced death. They consist of a thin outer pellicle, an inner, hard, blackish shell—both of which are inert—and a white, oleaginous *kernel*, which contains the acrid principle.

Castor oil is obtained by expression, by decoction, and by the agency of alcohol. The first method is that which is pursued in this country, where large quantities are made both for home consumption and exportation. Thus procured, it is nearly colourless, or of a pale-yellow colour, of a thick viscid consistence, a faint, unpleasant odour, and a mild, nauseous taste, and becomes rancid and thick by exposure to the air. It is extremely soluble in alcohol, readily so in ether, and forms soaps with alkalies. It is supposed to consist of three principles, termed *ricin*, *ricinolein*, and *ricinostearin*, which have not, however, been isolated.

Effects and Uses.—Castor oil is a mild and tolerably certain laxative, operating, when pure, without uneasiness in the bowels. It is admirably adapted to all cases where a free evacuation of the bowels is desired, without abdominal irritation, as in dysentery, pregnancy, &c., and is an excellent purgative for children. The *leaves* are said to possess *galactagogue* properties, and are applied to the breasts, in the form of decoction, to induce the secretion of milk.

Administration.—For adults the dose is ℥ss to ℥j; for children f℥j to f℥ss. To cover its unpleasant flavour, it is sometimes taken floating on spirit, coffee, mint-water, &c., or made into an emulsion, or mixed with the froth of porter.

Oil of Almonds, Flaxseed Oil, and Melted Butter, are laxative in the same doses as castor oil.

SULPHUR.

Sulphur exists in both kingdoms of nature. It is procured by the purification of native sulphur, and by the decomposition of the native sulphurets. The sulphur of commerce is generally obtained in the former way, chiefly from Sicily, and is termed *crude sulphur*. After importation, it is purified by sublimation, and is known as SUBLIMED SULPHUR. It is sometimes sublimed in the form of an impalpable powder, when it is called the *flowers of sulphur*. Sometimes it is cast in wooden moulds, and forms the roll sulphur or brimstone of commerce. Sublimed sulphur contains more or less sulphuric acid, and for medicinal use, it is further purified by washing, when it constitutes the SULPHUR LOTUM or WASHED SULPHUR of the Pharmacopœia. As met with in the shops, it is a fine bright-yellow powder, with a feeble odour and taste, insoluble in water, but soluble in alcohol, ether, and the oils; and when perfectly pure, it is wholly volatilized by heat, and ought not to change the colour of litmus paper.

Effects and Uses.—In small and repeated doses, sulphur is a gentle stimulant to the skin and mucous membranes; and in larger doses, it acts as a mild purgative, without exciting the pulse or occasioning griping. It is employed in the cases to which laxatives are applicable, and also as an alterative diaphoretic in chronic cutaneous diseases, rheumatism, and gout, and as an expectorant in pulmonary affections. To increase its cathartic effect, it is often combined with cream of tartar or magnesia. *Externally*, it is a valuable remedy in various skin diseases, particularly *scabies*.

Administration.—Dose, ʒi to ʒiij or ʒiv, in syrup, treacle, or milk. *Externally*, it is applied in the form of vapour-bath or *ointment*. *Unguentum Sulphuris* consists of one part of sulphur and two parts of lard. *Unguentum Sulphuris Compositum* contains also ammoniated mercury, benzoic acid, oil of bergamot, sulphuric acid, and nitrate of potassa.

SULPHUR PRÆCIPITATUM — PRECIPITATED SULPHUR, or *Lac Sulphuris*—is prepared by boiling together sulphur, slacked lime, and water, and afterwards precipitating the sulphur by muriatic acid. It is a finer and softer powder than sublimed sulphur, is of a paler yellow colour, with a grayish tint, and is not gritty between the teeth. As found in commerce, however, it is liable to be adulterated with sulphate of lime. Its effects, uses, and doses, are the same as those of sublimed sulphur.

SALINE CATHARTICS.

MAGNESIA.

Magnesia, sometimes called *calcined* magnesia, from the mode in which it is prepared, is procured by exposing the carbonate of magnesia to a red heat, till the carbonic acid is wholly expelled. It is a light, fine, white, colourless, odourless powder, of a feeble alkaline taste, very slightly soluble in water, and more soluble in cold than in hot water. *Henry's Magnesia*, a patent English medicine, has the advantage over the ordinary magnesia, of greater density and softness, and more ready miscibility with water. Magnesia, prepared by Mr. Husband, and Mr. Ellis, of Philadelphia, is very similar in properties to Henry's.

Effects and Uses.—Magnesia is antacid and laxative. A good deal of its cathartic effect is the result of its combination with the free acids of the stomach and intestines, in which soluble magnesian salts are formed. When taken in large quantities, and for too long a period, it sometimes accumulates in the bowels; and hence it is best to increase its solubility by giving it with lemonade. It is an excellent laxative where much acidity exists in the stomach; and is particularly useful in infantile cases. As an antacid, it is employed in heartburn, sick headache, and nephritic complaints. Dose, as a *laxative*, ʒj; as an *antacid*, ϑj, in milk. Of Henry's, half the quantity.

MAGNESIÆ CARBONAS—CARBONATE OF MAGNESIA.

Carbonate of magnesia, as found in the shops, is prepared by decomposing sulphate of magnesia with an alkaline carbonate. It occurs in the form of light white cubical cakes, or powder; is inodorous, almost insipid, and nearly insoluble in water, but soluble in carbonic acid water.

Its *effects and uses* are nearly the same as those of calcined magnesia; but, from its effervescence with the acids of the stomach, it is more apt to create flatulence. Dose, as a *laxative*, ʒj to ʒij; as an *antacid*, gr. x.

MAGNESIÆ SULPHAS—SULPHATE OF MAGNESIA.

This salt, commonly called *Epsom Salt*, from its having been first procured from the Epsom mineral waters in England, occurs in native crystals, and is a constituent of sea-water and many saline springs. It is obtained, in England, from *dolomite*, or magnesian limestone; and also from *bittern*, or the residual liquor of sea-water, from which common salt has been separated. In this country, it is extensively manufactured at Baltimore, by the action of sulphuric acid on *magnesite*, the silicious hydrate of magnesia. It is usually met with in small acicular crystals, which are colourless, transparent, and odourless, but have an extremely bitter taste. They effloresce on exposure to the air, are very soluble in water and insoluble in alcohol. The chemical composition of the salt is one equivalent of acid, one of magnesia, and seven of water of crystallization.

Effects and Uses.—Epsom salt is a mild, safe, refrigerant purgative, by far the most commonly employed of all the cathartics. It is sometimes combined with senna, sometimes with the bitter infusions, and is most agreeably administered in solution in carbonic acid water. Dose, ʒj.

LIQUOR MAGNESIÆ CITRATIS—SOLUTION OF CITRATE OF MAGNESIA.

Citrate of magnesia may be obtained by saturating a solution of citric acid, with either magnesia or its carbonate. It is a white, pulverulent, insipid salt, soluble in water, with a slight addition of carbonic acid. Dose, ℥ss to ℥j. It is only, however, in solution, with a slight excess of acid, and in the effervescing state, that it is officinal. The effervescing solution has a pleasant acid taste, without anything disagreeable. It is a very grateful cathartic, and has lately been much employed as a substitute for Epsom salt. From a half to a whole bottle of the solution of the Pharmacopœia may be given.

SODÆ SULPHAS—SULPHATE OF SODA.

Sulphate of soda, commonly called *Glauber's Salt*, is a constituent of many mineral springs, and is prepared in various chemical processes. It occurs as a residuum in the manufacture of muriatic acid; it is also made by adding sulphuric acid to chloride of sodium; and it is obtained from sea-water in the winter season. It is found in colourless, six-sided, efflorescent crystals, which are inodorous, but have a cooling, saline, very bitter taste. It is soluble in water, more readily in hot than in cold water, and is insoluble in alcohol. Its chemical composition is one equivalent of soda, one of acid, and ten of water.

Its *effects and uses* are very similar to those of Epsom salt, but it is more bitter and nauseous, and is now little used. Dose ℥j; in an effloresced state ℥ss.

SODÆ PHOSPHAS—PHOSPHATE OF SODA.

This salt is prepared by digesting powdered burnt bone with diluted sulphuric acid — and decomposing the resulting superphosphate of lime with carbonate of soda. It occurs in large, rhombic, colourless, transparent, very efflores-

cent crystals, which are wholly soluble in water, and insoluble in alcohol, and have a pleasant saline taste, resembling that of common salt.

Effects and Uses.—Phosphate of soda is a mild saline cathartic, well adapted, from its agreeable taste, to the cases of children and delicate persons, but too expensive for general use. It is a constituent of the blood in health, and has been recommended in cholera, as a restorative of deficient saline matters, and also in diseases where there is a deficiency of phosphatic matter in the bones. Dose, as a *cathartic*, ʒvi to ʒxij, in broth or soup; as an *alterative*, ϑj or ϑij, three or four times a day.

POTASSÆ SULPHAS—SULPHATE OF POTASSA.

This salt exists in both kingdoms of nature, and is obtained artificially from the residuum of the distillation of nitric acid. It occurs in small, hard, colourless, inodorous crystals, of a saline, bitter taste, which have no water of crystallization, and are unalterable in the air. They are moderately soluble in water, and are insoluble in alcohol.

Effects and Uses.—In small doses, it is considered a mild and safe cathartic; but, in large doses, it has proved a violent and even fatal poison, producing symptoms of cholera. It is thought to act as a *lactifuge*, or represser of milk, and is administered with this view in France. Dose, as a cathartic, gr. xv to ʒj, or ʒij; but it is little employed in this country. From its hardness and dryness it is useful to promote the trituration and division of powders, and for this purpose is employed in making Dover's powder.

POTASSÆ BITARTRAS—BITARTRATE OF POTASSA.

This salt, well known as *Cream of Tartar*, and termed also the acid tartrate of potash, exists in many vegetable juices, particularly the juice of grapes, from which it is obtained. It

is deposited, in an impure form, during fermentation, on the sides of wine-casks, and in this state occurs in crystalline cakes, of a reddish colour, known as *argol* or *crude tartar*. This is purified by solution and crystallization, and forms a white crystalline mass or powder, termed cream of tartar. It is without smell, has an acidulous and gritty taste, is very slightly soluble in water, and insoluble in alcohol. Its chemical composition is one equivalent of potash, one of tartaric acid, and one of water: the water cannot be expelled without decomposing the salt, which, when heated in a close vessel, is converted into a black flux, a compound of charcoal and carbonate of potash.

Effects and Uses.—In small doses, it is diuretic and refrigerant; in larger doses, cathartic; and in excessive doses, it will produce gastro-intestinal inflammation. It is employed to form a refrigerant drink, and as a gentle aperient, in fevers; and as a diuretic and hydragogue cathartic in dropsies. Dose, as an *aperient*, ʒj or ʒij; as a *cathartic*, ℥ss to ℥j, very often combined with jalap; as a *diuretic*, ℈j to ʒj, in repeated doses.

POTASSÆ TARTRAS—TARTRATE OF POTASSA.

This salt, formerly called *Soluble Tartar*, is obtained by saturating the excess of acid in cream of tartar with carbonate of potassa. It occurs in white deliquescent crystals or grains, of a saline, somewhat bitter taste, and is very soluble in water. It consists of two equivalents of potassa and one of acid. It is a gentle cathartic and diuretic, at present not much used. Dose, ℥ss to ℥j.

SODÆ ET POTASSÆ TARTRAS—TARTRATE OF POTASSA AND SODA.

This salt, commonly called *Rochelle Salt*, is made by saturating the excess of acid in cream of tartar with carbonate of

soda. It occurs in large, transparent, colourless, prismatic, slightly efflorescent crystals, of a mildly saline and bitter taste, readily soluble in cold water, and still more so in hot water. It consists of 1 eq. of soda, 1 of potassa, 1 of acid, and 10 of water. It is a mild and pleasant aperient, but it renders the urine alkaline, and should not therefore be given to persons suffering with phosphatic deposits in the urine. *Dose*, ʒss to ʒi. It is usually exhibited in the form of *Seidlitz Powders*, which consist of Rochelle salt (ʒij) and bicarbonate of soda (ϑij) in a blue paper, and tartaric acid (gr. xxxv) in a white paper. They are taken, dissolved in half a pint of water, while the liquid is in a state of effervescence, and form a very agreeable, mild aperient.

MILD ACRID CATHARTICS.

RHEUM — RHUBARB.

Rhubarb is the ROOT of Rheum palmatum, and of other species of Rheum (*Nat. Ord.* Polygonaceæ). It is not known with certainty what species yields the officinal rhubarb, but it is attributed by most writers to R. palmatum, a perennial plant, with large, roundish, cordate, half-palmate leaves, growing spontaneously in Chinese Tartary and Mongolia, and cultivated in Europe and this country, together with several other varieties, for the leaf-stalks, which make excellent tarts. Rhubarb roots are prepared for the market by being cleansed, deprived of their cortical portion, cut into pieces, pierced through their centre, strung upon a cord, and dried in the sun. Three principal sorts are known: Chinese, Russian or Turkey, and European. The first two are obtained, by different routes, from Central Asia. 1. *Chinese rhubarb* is the most common variety, and is imported principally from Canton. It occurs in roundish pieces, sometimes flattened, of a dirty brownish-yellow colour externally (the cortical portion apparently scraped off), having a ragged fracture, (which presents

red, yellowish, and white veins), and it is often perforated with holes, with portions of the cord on which it was dried occasionally remaining. It has a peculiar odour, an astringent, somewhat bitter taste, is gritty when chewed, and tinges the saliva of a yellow colour; its powder is yellowish, with a reddish-brown tinge. It is heavier than the Russian variety, and is generally inferior in quality to it; but the best pieces answer very well. 2. *Russian rhubarb* has probably the same source as the Chinese, but it is selected with greater care, and is rigorously inspected by the Russian government. It is carried in caravans through Russia to St. Petersburg, whence it is exported. The pieces are irregular in shape, and are often angular, from the cortical portion having been cut off and not scraped. They are less heavy and compact than the Chinese, of a livelier colour both externally and internally, and are perforated with larger holes, which have been made for the purpose of inspection. The taste and smell are very like those of the Chinese, but are more aromatic;—the powder is bright-yellow. 3. *European rhubarb* is of uncertain quality, and is seldom found in the shops. The kind most frequently met with is English rhubarb, which generally comes in pieces five or six inches long, and about an inch thick, and is called *stick rhubarb*. It is lighter, more spongy, and redder than the Asiatic varieties, with a feebler odour and less bitter taste.

Rhubarb imparts its virtues to both water and alcohol, but they are impaired by long boiling. Its most important chemical constituents are—*chrysophanic acid*, a yellow, odourless, tasteless, granular substance; two, or perhaps three *resins*, soluble in alcohol, and insoluble in water; and *bitter extractive*. It is supposed that the therapeutical properties of the drug depend chiefly on the conjoint operation of these principles. It contains also tannic and gallic acids, sugar, pectin, oxalate of lime, &c.

Effects and Uses.—In small doses, rhubarb is an astringent tonic. In larger doses, it is a slow and mild cathartic, occa-

sionally causing griping and accelerating the pulse, but never inflaming the mucous membrane of the alimentary canal like the drastics. It is much employed as a purgative in *diarrhœa*, in which it is particularly useful from its secondary astringent effect, and in *dyspepsia*, attended with costiveness, where it acts both as a stomachic and laxative. It is not adapted to febrile or inflammatory cases. In the bowel-complaints of children, rhubarb deservedly enjoys great popularity, and it is also highly esteemed in infantile scrofula. Made into a cataplasm, and applied to the abdomen, it acts as a purgative on children.

Administration.—Dose, as a *stomachic laxative*, gr. v, to gr. x; as a *purgative*, ℈i to ʒi. The following are the officinal preparations:—*Infusion* (ʒi to boiling water Oss), dose fʒi to fʒij, repeated; *Extract* (alcoholic), dose gr. x to gr. xxx; *Fluid Extract* (made with alcohol, and containing also aromatics), dose fʒj; *Tincture* (ʒiij to diluted alcohol Oij, with cardamom seeds); *Tincture of Rhubarb and Aloes; Tincture of Rhubarb and Senna* (containing rhubarb, senna, coriander, fennel seed, red saunders, saffron, liquorice, and raisins, and popularly known as *Warner's Gout Cordial*); *Tincture of Rhubarb and Gentian:* the dose of all the tinctures is fʒss to fʒi, and they are chiefly adapted to low forms of disease and persons accustomed to the use of stimulants; *Compound Pills of Rhubarb* (containing also aloes, myrrh, and oil of peppermint); *Syrup;* and *Aromatic Syrup* (containing cloves, cinnamon, and nutmeg, and much used in infantile cases under the name of *Spiced Syrup of Rhubarb*), dose for an infant, fʒi. *Wine*, not much used. Roasting impairs the cathartic power of rhubarb, and is said to increase its astringency.

JUGLANS—BUTTERNUT.—The INNER BARK of the ROOT of Juglans cinerea, or Butternut (*Nat. Ord.* Juglandaceæ), an indigenous forest tree, possesses cathartic properties, resembling

those of rhubarb. *Dose* of the bark, or of the *extract*, which is preferred, gr. x to gr. xxx.

ALOE—ALOES.

Aloes is the INSPISSATED JUICE of the LEAVES of Aloe spicata, Aloe Socotrina, and other species of Aloe (*Nat Ord.* Liliaceæ), succulent, herbaceous plants, growing in warm countries. The finest kinds are obtained by exudation; those prepared by expression and by boiling are inferior. Four principal varieties are known in commerce—Cape, Socotrine, hepatic, and Barbadoes aloes, the first two of which are the most used in the United States. 1. *Cape aloes*, which is much the most common, is obtained from the Cape of Good Hope, where it is collected indiscriminately from A. spicata, and other species. It has a shining, resinous appearance, is of a deep-brown colour, with a greenish tint, translucent at its edges, and has a glossy or resinous fracture. Its powder is greenish-yellow; its odour is strong and disagreeable, but not nauseous. 2. *Socotrine aloes*, when genuine, is the choicest variety. It is produced in the island of Socotra, and on the eastern coast of Africa, from A. Socotrina, and occurs in pieces of a yellowish or reddish-brown colour, becoming darker on exposure to the air, with a smooth and conchoidal fracture, the interior being lighter-coloured than the exterior. Its powder is golden-yellow; its odour peculiar but not unpleasant, and its taste bitter and disagreeable, but aromatic. 3. *Hepatic aloes* is probably an inferior variety of Socotrine, and is seldom met with in our shops. It is of a reddish-brown colour, but darker and less glossy than the Socotrine. 4. *Barbadoes aloes* comes from the West Indies, the product chiefly of A. vulgaris. Its colour is not uniform, varying from a dark-brown or black to a liver colour. It has a dull fracture; makes an olive-yellow powder; and is distinguishable by its particularly disagreeable, nauseous odour. The taste

of all the varieties of aloes is intensely bitter, and very tenacious.

Aloes yields its virtues to water and alcohol. A proximate neutral crystalline principle, termed *aloine*, has lately been extracted from it by Messrs. T. and H. Smith, of England, which produces the cathartic action of aloes in doses of gr. i to gr. ij. It is slightly soluble in cold water, but readily soluble in hot water and alcohol.

Effects and Uses.—Aloes, in small doses, is tonic, and in large doses, purgative. As a cathartic, it is remarkable for the slowness of its operation, and its special action on the large intestine and the pelvic viscera generally. Hence, it is objectionable in cases of hemorrhoids, irritation of the genito-urinary apparatus, pregnancy, &c.; and, on the other hand, is useful in amenorrhœa. It is principally employed in cases of dyspepsia, accompanied by costiveness, dependent on a torpid condition of the large intestine. It is also useful as a revulsive in cerebral affections, and has proved efficacious as an anthelmintic. As a purgative, it holds an intermediate rank between rhubarb and senna.

Administration.—Dose, gr. v to gr. x–xx, in pill; it is usually given in combination with other cathartics. The officinal preparations are:—*Pills of Aloes and Assafetida*, useful in flatulent constipation; *Pills of Aloes and Myrrh*, or *Rufus's Pills*, employed in amenorrhœa; *Powder of Aloes and Canella*, known as *hiera picra*; *Tincture* (ʒj to alcohol Oss, distilled water Oiss, with liquorice), dose, fʒss to fʒiss; *Tincture of Aloes and Myrrh*; *Wine of Aloes.*

SENNA.

Senna consists of the LEAFLETS of several species of Cassia (*Nat. Ord.* Fabaceæ), small shrubs, which grow in the tropical regions of Asia and Africa. The species recognised as officinal are C. acutifolia, C. obovata, and C. elongata; and

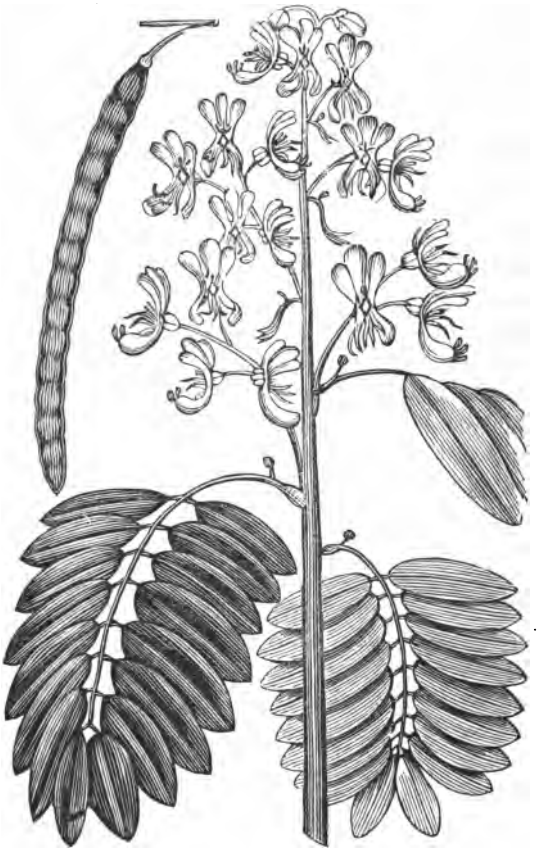
besides these, C. lanceolata, and C. Æthiopica, are also generally received as sources of the drug. The commercial varieties of senna, which are found in the United States, are the Alexandria, the Tripoli, the India, and the Mecca senna. 1. *Alexandria senna*, which comes from the port of this name in Egypt, is made up chiefly of the leaflets of C. acutifolia, (which are yellowish-green, acute in shape, and less than an inch in length), intermingled with the pods, leafstalks, flowers, &c., of this plant. It contains also leaflets of C. obovata, known by their rounded, obtuse summits; and is, moreover, generally adulterated with the leaves of Cynanchum oleæfolium, distinguishable, by their greater length, thickness, and firmness, from the genuine leaves. 2. *Tripoli senna*, brought from Tripoli, consists of the leaflets of C. Æthiopica, which are shorter, less acute, thinner, and more fragile than those of C. acutifolia, and are generally much *broken up*. 3. *India senna* is produced in Arabia, but comes into commerce through the ports of Hindostan. It consists of the leaflets, intermixed with the leafstalks and pods, of C. elongata, and is readily recognised by the long, narrow, *pike-like* shape, and dark hue of the leaflets. A finer variety of India senna, cultivated at *Tinnevelly*, in Hindostan, has been known for some years past, which is distinguishable from the common sort of India senna, by the bright-green colour of the leaflets. 4. *Mecca senna* is a variety lately introduced, and consists of leaflets, intermediate in length between those of C. acutifolia and C. elongata, and has in mass a yellowish, tawny hue. Its source is not known with certainty, but it is probably the product of C. lanceolata.

Commercial senna is prepared for use by separating the leaflets from the stalks, adulterations, &c.; the pods possess cathartic properties, but are less active than the leaves. The odour of senna is faint and sickly; its taste bitter, sweetish, and nauseous. It imparts its virtues to water and alcohol, its infusion being of a reddish-brown colour. It

CASSIA MARILANDICA—AMERICAN SENNA.

(See page 185.)

Fig. 17.



contains a peculiar substance called *cathartin* (which is not, however, the active principle), extractive, chlorophylle, &c.

Effects and Uses.—Senna is a prompt, efficient, and safe

cathartic, well adapted to febrile and inflammatory cases: it operates on the entire track of the intestinal canal, and produces watery, feculent discharges. Its tendency to gripe may in a great measure be counteracted by combining aromatics or neutral salts with it; the addition of bitters promotes its cathartic activity.

Administration.—The dose in *powder* is ʒss to ʒij; but it is usually given in *infusion* (ℨj to boiling water Oj, with coriander, ʒj), one-third for a dose, repeated. *Confectio sennæ* (made with senna, coriander, liquorice, figs, and pulps of prunes, tamarinds, and purging cassia), is an excellent mild cathartic, much used for pregnant women, dose ʒij; of the *fluid extract*, the dose is fℨss; *syrup*, used for children, dose fʒi to fʒij; *tincture of senna and jalap*, dose fℨss to fℨj.

CASSIA MARILANDICA—AMERICAN SENNA—or *Wild Senna* (*Nat. Ord.* Fabaceæ), possesses cathartic properties similar to those of imported senna, but is less active. It is an indigenous plant, common in the Southern and Western States, growing to the height of three or four feet, with alternate leaves, composed of from eight to ten pairs of oblong, lanceolate, pale-green leaflets, and bearing handsome golden-yellow flowers, and a pendulous fruit two to four inches long. An *infusion* of the LEAFLETS is given in doses one-third larger than those of senna.

DRASTIC CATHARTICS.

JALAPA—JALAP.

Jalap is the ROOT of Ipomœa Jalapa (*Nat. Ord.* Convolvulaceæ), a climbing plant of Mexico, which derives its name from the city of Jalapa, near Vera Cruz. The roots are imported either whole or in slices. When entire, they vary in size and shape from a walnut to a large pear, are hard and heavy—externally, brown and wrinkled, and internally grayish. They have a heavy, sweetish, rather nauseous smell, and a sweetish, acrid, disagreeable taste. They yield their virtues

PODOPHYLLUM PELTATUM—MAY-APPLE.

(See page 187.)

Fig. 18.

partly to water, partly to alcohol, and completely to diluted alcohol. In the shops, jalap is kept in the state of powder, which is of a yellowish-gray colour. Its active principle is a peculiar *resin;* it contains also starch and gum, which are apt to be attacked by worms, the worm-eaten pieces becoming thus the most active.

Effects and Uses.—Jalap is a powerful hydragogue cathartic, operating with great promptness, and often causing much

pain. In over-doses, it may produce dangerous hypercatharsis. It is employed as a hydragogue in dropsy, when it is often combined with cream of tartar; as a revulsive in cerebral and other affections; and to increase the activity of calomel in bilious fevers. Dose, gr. xv to xxx—in combination gr. x. Of the *extract*, which is made with diluted alcohol, and contains the resin and gum, the dose is one half that of jalap. The *compound powder* of jalap contains one part of jalap and two parts of cream of tartar. The *tincture* (℥vi to diluted alcohol Oij), is added to cathartic mixtures.

PODOPHYLLUM—MAY-APPLE.

Podophyllum peltatum, May-apple, or Mandrake (*Nat. Ord.* Ranunculaceæ), is a very common indigenous, herbaceous plant, with a long, creeping, perennial root, and an upright stem about a foot high, separating at top into two petioles, each supporting a large peltate leaf, divided into five or six lobes. At the fork of the petioles it bears a single flower, which appears in May, the fruit ripening in September. The ROOT, which is the part used, is found in the shops in wrinkled, jointed pieces, about two lines in diameter, of a brown colour externally, and yellowish within. The powder is yellowish-gray, and has a sweetish smell; its taste is at first sweetish, afterwards bitter, acrid, and nauseous. Diluted alcohol is the best solvent of podophyllum, which has been found to contain two *resinous* cathartic principles, both soluble in alcohol.

Effects and Uses.—This is an active hydragogue cathartic, analogous in its operation to jalap, for which it might very well be substituted. It is an ingredient in several cathartic nostrums. Dose, in *powder*, ℈i; of the *extract* (prepared like the *extract of jalap*), gr. v to gr. xv.

SCAMMONIUM—SCAMMONY.

Scammony is the CONCRETE JUICE of the ROOT of Convol-

vulus Scammonia (*Nat. Ord.* Convolvulaceæ), a twining plant of Syria. The finest kind is the product of exudation, from the sliced root; but most of the drug which reaches us is probably obtained by expression. It comes from the Levant. Genuine scammony, termed *Virgin Scammony*, occurs in light, irregular, friable pieces, covered with a whitish-gray powder, and breaking with a bright, greenish fracture. The scammony of the shops, which is always more or less adulterated, is in hard, heavy, saucer-shaped cakes, from four to six inches in diameter (sometimes broken into pieces), of a dark ash or slate colour. The powder is light-gray; the smell disagreeable, like that of old cheese; the taste at first feeble, afterwards bitterish and acrid. Scammony is a gum-resin, its active ingredient being *resin*, which constitutes more than three-fourths of the weight of good scammony. It is partially dissolved by water, more largely by alcohol and ether.

A factitious scammony, made in France, and known as *Montpelier Scammony*, is occasionally imported into the United States. It is blacker than the genuine article, has a feeble, balsamic odour, and a very bitter nauseous taste.

Effects and Uses.—Scammony is an energetic hydragogue cathartic, operating sometimes with great violence, and seldom given, except in combination with other cathartics. *Dose*, gr. v to gr. xv of the pure drug, gr. x to gr. xxx of the drug of the shops. It is much used in the form of *compound extract of colocynth.*

Helleborus Niger—Black Hellebore.—The root of Helleborus Niger, Black Hellebore, or Christmas Rose (*Nat. Ord.* Ranunculaceæ), a mountainous European plant, at one time enjoyed much reputation as a hydragogue cathartic and emmenagogue. It is now little used, and only as an emmenagogue. Dose of the *powdered root* or *extract*, gr. x to gr. xx; of the *tincture* (ʒiv to diluted alcohol Oij), fʒss to fʒi.

COLOCYNTHIS — COLOCYNTH.

Colocynth is the FRUIT of Citrullus Colocynthis or Bitter Cucumber (*Nat. Ord.* Cucurbitaceæ), an annual plant of the south of Europe and parts of Asia and Africa, resembling the common watermelon. The fruit is *peeled* and dried for exportation, and comes to us from the Levant. It consists of light, whitish, spongy balls, about the size of a small orange, filled with numerous seeds. For medicinal use, the *pulp* only is employed, and the seeds, which are inactive, are rejected. The pulp has a feeble odour, and a nauseous, intensely bitter taste. It yields its virtues to both water and alcohol, and contains a peculiar bitter principle, termed *colocynthin*, resin, &c.

Effects and Uses.—Colocynth is a violent hydragogue cathartic, acting sometimes very harshly even in small doses, and in over-doses producing dangerous, and occasionally fatal enteric inflammation. The dose is gr. v to gr. x. It is seldom, however, administered alone. In the form of *compound extract* (which contains also aloes, scammony, and cardamoms), it is a favourite prescription—dose, gr. v–xx; and the compound extract, combined with extract of jalap, calomel, and gamboge, constitutes a very popular cathartic compound, known as the *compound cathartic pills.*

GAMBOGIA — GAMBOGE.

Gamboge is a GUM-RESIN, procured in Siam and Cochin-China, from a tree which has never yet been examined by botanists. The juice is said to be collected, as it exudes from the wounded bark of the tree, in cocoa-nut shells, and is afterwards rolled into cylinders, or transferred to earthen jars to dry; it is sométimes also received into the hollow joints of the bamboo. It is imported from Canton and Calcutta, and occurs in cylindrical rolls from one to three inches in diameter, of an orange colour, known as *pipe gamboge*, or in irregular

masses (which are less pure), weighing two or three pounds or more, called *cake* or *lump gamboge*. Good gamboge is opaque, brittle, inodorous, nearly insipid, and breaks with a vitreous fracture; its powder is bright-yellow. It is a gum-resin, forming a yellow opaque emulsion with water, and a golden-yellow solution with alcohol.

Effects and Uses.—Gamboge is a powerful hydragogue, and in over-doses has proved fatal. It is employed in obstinate constipation—in dropsies, combined with cream of tartar or jalap—and has been given to destroy tænia. *Dose*, gr. ij to gr. vi. It is often prescribed with other and milder cathartics, to promote and accelerate their action.

ELATERIUM.

Elaterium is a substance deposited by the JUICE of the FRUIT of Momordica Elaterium, or Squirting Cucumber (*Nat. Ord.* Cucurbitaceæ), an annual vine of the South of Europe, now cultivated in England. The fruit has the shape of a small oval cucumber, and, when fully ripe, separates from the peduncle, and throws out its juice and seeds with considerable force, through an opening in the base. Pure elaterium is obtained by slicing the fruit and allowing the juice to drain through a sieve. The juice deposits a *sediment*, which dries in very light, thin, nearly flat, pulverulent, greenish-gray cakes, and is the genuine elaterium. It is almost inodorous, and has a bitter, acrid taste. The commercial elaterium, which is obtained chiefly from England, is made by expression. The drug is to be considered inferior when it is dark-coloured, much curled, and hard. Elaterium yields its virtues to alcohol and not to water. Its active principle is called *elaterin*, and proves powerfully cathartic in doses of $\frac{1}{12}$ to $\frac{1}{20}$ of a grain.

Effects and Uses.—Elaterium is a hydragogue cathartic of great violence of operation, and in over-doses has frequently

proved fatal. It has also a diuretic action. It is a very efficient remedy in the treatment of dropsies, and is also a useful revulsive in cerebral affections; but, in administering it, considerable caution is required. *Dose* of the *pure* drug (termed *Clutterbuck's elaterium*), gr. ½; of the drug of the shops, gr. i to gr. ij; but it is most safely given in divided doses.

OLEUM TIGLII—CROTON OIL.

Croton oil is obtained from the SEEDS of Croton Tiglium (*Nat. Ord.* Euphorbiaceæ), a small tree of the East Indies. The Croton seeds resemble the Castor seeds in shape and size, and consist of a blackish shell, sometimes covered with a yellowish-brown epidermis, and enclosing a yellowish oily kernel. They are highly irritant and cathartic, but are not imported into this country. They contain a volatile oil, a FIXED OIL, resin, crotonic acid, &c. The CROTON OIL of the shops is obtained by expression, and is a mixture of the fixed oil proper, the resin, and crotonic acid. It is made both in India and England; the Indian oil being of a pale straw-colour, and the English reddish-brown. It has a viscid consistence, which is increased by age, a faint peculiar odour, and an extremely acrid, pungent taste; it is soluble in ether and the volatile and fixed oils, and partially so in alcohol.

Physiological Effects.—Croton oil, taken internally, is a powerful hydragogue purgative, occasionally increasing also the secretion from the kidneys. One or two drops are usually sufficient to produce active catharsis, but sometimes as much as eight or ten drops may be taken without affecting the bowels. It operates very speedily, often causing evacuations in half an hour, and is apt to produce considerable depression of the vascular system. In over-doses, it has frequently proved fatal. *Rubbed on the skin*, croton oil causes rubefaction and a pustular or vesicular eruption; and rubbed over the abdomen, it will sometimes purge.

Medicinal Uses.—Croton oil, from the smallness of the dose required, and the speediness of its action, is an extremely valuable purgative in obstinate constipation, and in cerebral disorders, particularly coma. As a *counter-irritant*, it is extensively employed in pulmonary and laryngeal affections, diseases of the joints, &c. *Dose*, one or two drops, made into pill, with bread-crumbs. For *external use*, it may be diluted with one or two parts of olive oil or oil of turpentine.

MERCURIAL CATHARTICS.

The preparations of mercury, employed as cathartics, are *calomel*, *blue pill*, and *mercury with chalk*. Their purgative effects depend partly on the increased flow of bile which they occasion, and partly on the stimulus which they give to secretion from the mucous follicles of the intestinal canal, and from the pancreas. They are rarely employed alone, owing to the slowness and uncertainty of their action; but are usually combined with, or followed by other cathartics (as jalap, senna, rhubarb, compound extract of colocynth, or some of the saline preparations). The mercurial cathartics are usually administered with a view of combining a purgative action with an effect on the secretions, particularly that of the liver; also, as anthelmintics; and as revulsives in cerebral and other affections. They are well adapted to infantile cases, from the facility of their administration, and are especially beneficial in the ephemeral febrile attacks to which children are subject; they, moreover, rarely produce salivation in children.

HYDRARGYRI CHLORIDUM MITE—MILD CHLORIDE OF MERCURY, or *Calomel.*—(Noticed at length under the head of *Alteratives*). Dose, as a *cathartic*, gr. vi to xij, in pill or in powder, with syrup or molasses; to be followed, in from four to six hours, by some other cathartic. Sometimes, when it is exhibited with a view to a full action on the liver, gr. i or ij may be given every hour or two until the whole pur-

gative dose is taken; or, it may be administered at bed-time, with an aperient draught the next morning. For children, larger doses are required in proportion than for adults: gr. iij—vi may be given to a child two or three years old. Calomel occasionally causes griping pain in the bowels, with bilious vomiting; this is attributable, not to any irritable qualities in the medicine, but to the acrid character of the bile secreted. Calomel is an ingredient of the *Compound Cathartic Pills.*

PILULÆ HYDRARGYRI—MERCURIAL PILLS,—commonly called *Blue Pills* (see *Alteratives*), are analogous in their cathartic action to calomel, but milder. They are given in about the same doses, and in the same combinations, &c.

HYDRARGYRUM CUM CRETA—MERCURY WITH CHALK,—(see *Alteratives*), combines antacid with mercurial effects. It is a very mild preparation—weaker than even blue pill. It is used as a laxative, in bowel-complaints and other affections of children. Dose, gr. v—xx for adults; for children, gr. ij or iij to gr. viij or x, in *powder*, and not in pill.

ENEMATA.

In cases of irritability of the stomach—or with the view of hastening the action of cathartics taken by the mouth—or to remove feculent accumulations in the lower bowels—or to relieve tympanitis—or for the purpose of revulsion, *cathartic enemata* are frequently administered.

When it is desired simply to open the bowels mechanically, tepid water, flaxseed tea, or other demulcent infusion may be employed. The common *laxative enema* consists of a tablespoonful of common salt, molasses, and lard or olive oil, each, in two-thirds of a pint of warm water; castor oil, or Epsom salt, may be added to increase the cathartic effect. Senna tea, or some other cathartic infusion, is often employed. To relieve flatulency, oil of turpentine (f℥ss to f℥i, in emul-

sion), or Milk of assafetida (f℥ij to f℥iv), may be given. The latter is an excellent preparation in infantile cases.

ORDER III.—DIAPHORETICS.

Diaphoretics (from *διαφορεω, I transpire*), called also *sudorifics*, are medicines which promote transpiration from the skin. The action of the cutaneous exhalants may be increased by various means. The mere introduction of a large quantity of fluid into the system will produce sweating, if the skin be kept warm. Exercise and a warm temperature, by determining a flow of blood to the cutaneous vessels, act in the same way. Nauseants occasion diaphoresis, by relaxing the orifices of the cutaneous vessels; stimulants, by exciting them to increased secretion. Diaphoretics are employed therapeutically, for their evacuant, revulsive, and alterative effects, and to promote absorption. Different classes of diaphoretics are required for different morbid conditions.

1. *Nauseating Diaphoretics.*—Most of the *emetics*, in nauseating doses, produce a powerful relaxing diaphoretic action, and are much employed, with this view, in inflammatory cases, when not contra-indicated by the presence of gastric irritability. The PREPARATIONS OF ANTIMONY (see p. 150), and IPECACUANHA (see p. 162), are chiefly resorted to as nauseating diaphoretics. Ipecacuanha is often given, as a diaphoretic, in combination with opium, in the form of *Dover's Powder* (see p. 41).

2. *Refrigerant Diaphoretics.*—The saline and ethereal preparations classed as *refrigerants* (see p. 153), produce a gentle relaxing diaphoretic action, unattended with nausea. They are used to allay febrile excitement.

3. *Stimulating Diaphoretics.*—This group includes the diffusible stimulants, aromatic substances generally, of every class, and many narcotics, particularly opium and camphor. They are contra-indicated in high inflammation, but are very

serviceable in rheumatic and pulmonary affections, after vascular excitement has been reduced, and in all diseases where the surface of the body is cold. *Opium*, in the form of *Dover's Powder*, may be employed in inflammatory cases, where other stimulating diaphoretics are inadmissible, and is given with advantage in an early stage of acute rheumatism, dysentery, and catarrh, unless the action of the pulse be very strong, when depletion should be previously resorted to. The operation of the diaphoretic stimulants is promoted by the free use of warm diluent drinks, and warm covering to the body.

4. *Alterative Diaphoretics.*—Under this head are comprised a class of diaphoretic medicines, which produce a gradual and nearly insensible increase of the cutaneous secretion, and are supposed to promote the elimination of noxious matters from the blood, through the vessels of the skin. They are employed chiefly in chronic rheumatic and cutaneous affections, and in secondary syphilis.

ALTERATIVE DIAPHORETICS.

SARSAPARILLA.

The name Sarsaparilla is applied to the ROOTS of Smilax officinalis and other species of Smilax (*Nat. Ord.* Smilaceæ), twining, prickly shrubs of Mexico, Guatemala, and the warm countries of South America. The roots consist of numerous wrinkled, slender pieces, of the average thickness of a writing quill, several feet long, springing from a common head or rhizoma, and are frequently found in the shops with portions of the stems attached. Several varieties are known: 1. *Honduras Sarsaparilla*, the most common variety in the United States, comes in bundles two or three feet long, composed of several roots folded lengthwise, of a dirty grayish or reddish-brown colour. 2. *Jamaica Sarsaparilla*, which is probably derived also from Central America, comes in

shorter bundles, and is known by the red colour of the epidermis. 3. *Vera Cruz Sarsaparilla* has smaller radicles than the Honduras variety. 4. *Brazilian Sarsaparilla* is distinguished by the amylaceous character of its interior structure. 5. *Caraccas Sarsaparilla* comes from La Guayra, and resembles the Brazilian.

Sarsaparilla roots consist of a whitish, brown, or pink cortical portion, covered with a thin gray, brown, or red epidermis, and enclosing a layer of whitish ligneous fibre, and a central pith. The *cortical portion* is more active than the interior portions; the central medulla contains a good deal of starch. Sarsaparilla, in the dried state, is nearly inodorous, but its decoction has a strong smell. It has a mucilaginous, slightly bitter taste, and, when chewed for some time, produces a persistent acrid impression on the mouth; this acridity of taste is the criterion of good sarsaparilla. Water and diluted alcohol extract its virtues, but they are impaired by long boiling. It contains an active principle, called *smilacin* or *sarsaparillin*, starch, resin, extractive, &c. It has lately been announced that iodine, in the form of iodide of potassium, has been detected in sarsaparilla.

Effects and Uses.—The physiological effects of sarsaparilla, beyond a slight diaphoretic action, are not very obvious; in large doses, it occasionally produces nausea and vomiting. Its efficacy, however, in eradicating various morbid symptoms is well established, and its mode of action, though obscure, is generally attributed to a purifying influence on the blood, through the function of the skin. It is employed in secondary syphilis, particularly where the disease resists or is aggravated by the use of mercury; also in chronic rheumatism, skin diseases, and cachectic conditions of the system generally.

Administration.—Dose, of the *powder*, ʒss, three or four times a day—not much used, however, in this form; of the *infusion* (ʒi to boiling water Oj), fʒij to fʒiv, three times a

day. The *compound decoction* is made by boiling sarsaparilla with sassafras, guaiacum wood, liquorice-root, and mezereon. The *compound syrup* (which contains also guaiacum wood, rose leaves, senna, liquorice-root, and the oils of sassafras, anise, and partridge-berry), is a favourite preparation. Dose, f℥ss, three times a day. Of the alcoholic *extract*, which is a good preparation, the dose is gr. x to gr. xx, three or four times a day. The *fluid extract* is a compound preparation, having the ingredients of the compound decoction, except the guaiacum—dose, f℥j, three or four times a day.

ARALIA NUDICAULIS—FALSE SARSAPARILLA.

The ROOT of Aralia Nudicaulis, False Sarsaparilla, or Small Spikenard (*Nat. Ord.* Araliaceæ), a small, indigenous, perennial plant, possesses alterative diaphoretic properties similar to those of sarsaparilla, and is employed as a substitute for it, in the same manner and doses.

The ROOT of *A racemosa*, or *American Spikenard*, and the BARK of *A. spinosa*, or *Angelica-Tree*, are also employed as alterative diaphoretics.

GUAIACI LIGNUM—GUAIACUM WOOD.

GUAIACI RESINA—GUAIAC.

Guaiacum Wood, or *Lignum Vitæ*, and Guaiac, are products of Guaiacum officinale (*Nat. Ord.* Zygophyllaceæ), a large evergreen tree of South America and the West Indies. The WOOD, which is remarkable for its hardness and density, is imported in logs or billets, covered with a thick gray bark; the outer portion or sapwood is of a pale-yellow colour, the inner of an olive-brown. It is usually kept in the shops in the state of shavings or raspings; they are inodorous, unless heated, and when chewed for some time, they have a bitterish, pungent taste. Guaiacum wood yields its virtues to alcohol,

and partially to water; they depend on the guaiac contained in the wood.

Guaiac is the CONCRETE JUICE of Guaiacum officinale. It is obtained by spontaneous exudation, or by incisions made in the trunk, or by boiling the chips in a solution of salt, and skimming off the matter which rises to the surface. It comes in large, irregular, semi-transparent, brittle pieces, of varying size—externally, of a deep green or olive colour, and internally, red. It has a slight, balsamic odour, which is rendered stronger by heat, and, though at first nearly tasteless, leaves a hot, acrid sensation in the mouth and throat. Water dissolves it partially, alcohol completely. It consists chiefly of a peculiar resinoid prineiple, called *guaiacin* or *guaiacic acid*, which is decomposed by the mineral acids.

Effects and Uses.—Guaiacum wood and guaiac are stimulant diaphoretics, and in large doses cathartic. They are principally used for their alterative virtues in chronic rheumatism, secondary syphilis, and skin diseases. They are considered also to possess emmenagogue properties, and are employed in amenorrhœa and dysmenorrhœa.

Administration.—*Guaiacum wood* is used only as an ingredient in the compound decoction and syrup of sarsaparilla. Dose of *guaiac*, gr. x to gr. xxx, in pill or emulsion, sometimes combined with alkalies. The *tincture* (℔ss to alcohol Oij), and *ammoniated tincture* (℥iv to ar. sp. of ammonia Oiss), are much used in chronic rheumatism; the former is given also in amenorrhœa,—dose, f℥i three or four times a day. They are decomposed by water.

MEZEREUM—MEZEREON.

Mezereon is the BARK of Daphne Mezereum, and Daphne Gnidium (*Nat. Ord.* Thymelaceæ), European shrubs, which grow to the height of four or five feet. The root-bark is the part employed in Great Britain, but the bark of our shops, which is

brought from Germany, is the STEM-BARK. It comes in strips, from two to four feet long, and an inch or less in breadth, folded in bundles, or wrapped in the shape of balls. It has a thin, grayish, or reddish-brown, wrinkled epidermis, and a tough, pliable, whitish inner bark. When fresh, it has a faint nauseous smell, but when dry, it is nearly inodorous. Its taste is at first sweetish, afterwards highly acrid. It yields its virtues to water by decoction, and contains a peculiar crystalline principle, called *daphnin*, and a *resin*, to which it owes its acridity.

Effects and Uses.—The topical action of mezereon is irritant and vesicant. When swallowed in large quantities, it is highly acrid; in medicinal doses, it promotes the action of the secreting and exhaling organs, particularly the skin and kidneys. It is chiefly employed in conjunction with sarsaparilla (in the compound decoction, &c.), as an alterative diaphoretic, in rheumatic, syphilitic, and cutaneous affections. As a *masticatory*, it has been chewed for the relief of paralysis of the muscles of deglutition. The *ointment* is used as a stimulating application to blistered surfaces and indolent ulcers.

SASSAFRAS RADICIS CORTEX—BARK OF SASSAFRAS ROOT.

This is the BARK of the ROOT of Sassafras officinale (*Nat. Ord.* Lauraceæ), an indigenous tree of middling size. The bark is found in the shops in small irregular pieces of a cinnamon colour, sometimes invested with a brownish epidermis. It has a highly fragrant odour, and a sweetish aromatic taste. Its virtues are extracted by water and alcohol, and reside in a *volatile oil* (*oleum sassafras.*)

Effects and Uses.—Sassafras bark is a mild stimulant alterative diaphoretic, used chiefly in combination with sarsaparilla. Its principal virtues are probably aromatic. Dose of

the *oil*, two to ten drops. (For *Sassafras Pith*, see *Demulcents*.)

ORDER IV.—DIURETICS.

Diuretics (from δια, *thoroughly*, and ουρεω, *I make water*), are medicines which excite the secretion of urine. The flow of urine may be promoted *indirectly*, by increasing the quantity of fluid taken into the stomach, or by the removal of causes which check its secretion, or by mental emotion, a cool temperature, &c. It is promoted *directly* by the use of medicinal agents which specifically affect the kidneys; they are termed diuretics. A large proportion of diuretic medicines are found among the agents which influence other secretions, particularly *diaphoretics*. The functions of transpiration and urination are to some extent vicarious, and the same articles will prove diaphoretic or diuretic, as their action may be directed to the skin or kidneys. External warmth and warm drinks determine the action of such medicines to the skin; and, on the other hand, if the skin be kept cool, and cool diluents freely administered, the secretion from the kidneys is promoted.

Blennorrhetics, or medicines which have a special action on the mucous membranes, exert also a diuretic influence—probably the result of the stimulating impression which they make on the mucous membrane of the urinary passages. When the action of the kidneys is obstructed by disease of the heart, *sedatives* prove diuretic, by their tranquillizing influence on the action of the heart. In cases of obstruction of the portal system, *mercurials* increase the efficacy of the diuretics proper; and also *cathartics*, by stimulating the flow of bile and of the pancreatic juice.

The principal *therapeutic* employment of diuretics is *to promote the absorption of dropsical effusions*. They are also useful, in nephritic disorders attended with obstructed secretion;

in stone or gravel, with the view of rendering the urine more dilute; and they may be resorted to as evacuants, to reduce inflammation.

As diuretics act by becoming absorbed, they should be administered in a very diluted state, to prevent a cathartic effect.

The following groups of medicines, noticed under other heads, are employed also as diuretics:—

1. *The Saline and Ethereal Refrigerants* (see p. 153).

2. *The Alkaline Carbonates* (see *Antacids*); and the *Alkaline Salts, which contain a vegetable acid,* as the acetates, citrates, and tartrates. The acid tartrate of potassa, or CREAM OF TARTAR (see p. 176), is a very active diuretic.

POTASSÆ ACETAS—ACETATE OF POTASSA.—This salt, formerly termed *sal diureticus,* from its decided diuretic action, is made by saturating acetic acid with carbonate of potassa. It is white, when pure, of a warm, pungent taste, very deliquescent, and soluble in water and alcohol. In small doses, it is diuretic; in larger doses, gently cathartic. It is a good deal employed as a diuretic in dropsies, and has also been found useful as an alterative in cutaneous affections. *Dose,* ℈i to ʒi, 3 or 4 times a day.

3. *Sedatives* (see p. 147), particularly DIGITALIS (see p. 148), which is very much employed in *cardiac* dropsies, in combination with squill.

4. *Blennorrhetics* (see p. 211), particularly the OLEO-RESINS.

5. Most of the *Stimulating Diaphoretics.*

6. Among *Astringents,* UVA URSI (p. 120), and PIPSISSEWA (p. 121).

SPECIAL DIURETICS.

SCILLA—SQUILL.

Squill is the BULB of Scilla maritima (*Nat. Ord.* Liliaceæ), a perennial plant, which grows on the shores of the Mediterranean. It has fibrous roots, attached to a roundish-ovate

bulb, from which both the leaves and flower-stem spring directly, the latter appearing first; the leaves are broad-lanceolate, and from 12 to 18 inches long; the stem is about two feet high, and bears pale, yellowish-green flowers.

The fresh bulb is pyriform, of the size of the fist to that of a child's head, and consists of thick, fleshy, concentric scales, attenuated at their edges, and attached to a rudimentary stem; the outer scales are very thin and papery. Two kinds of squill bulbs are met with, the *white* and the *red*, which differ only in the colour of their scales, and are identical in medicinal virtues. Both abound in a viscid, acrid juice, which is very much diminished by drying, with little loss of medicinal power. For importation, squill is usually sliced and dried, and is found in the shops in white or yellowish-white pieces, which, when dry, are brittle, but, when moist, flexible. They absorb moisture readily, and should be kept in well-stoppered bottles. They have a feeble odour, a bitter, nauseous, acrid taste, and yield their virtues to water, alcohol, and vinegar. A bitter principle, called *scillitin*, has been obtained from squill.

Physiological Effects.—In small doses, squill promotes secretion from the mucous membranes and the kidneys—its diuretic effect being much the most marked and constant. In larger doses, it excites nausea, vomiting, and occasionally purging; and, in excessive doses, it acts as an acro-narcotic poison—gr. xxiv having proved fatal.

Medicinal Uses.—Squill is employed principally in the treatment of dropsy; it should not be used, however, in cases complicated with granular disease of the kidneys or inflammation of the bladder. Digitalis is much prescribed in combination with squill in the treatment of cardiac dropsies, and calomel is often added with a view to its action on the absorbents. As a *blennorrhetic expectorant*, squill is an excellent remedy in chronic and subacute bronchial affections; it is, however, improper in inflammatory cases. As an *emetic*,

squill is too dangerous for general use; but it forms an ingredient in some emetic preparations administered in croup.

Administration.—Dose, as a *diuretic* or *expectorant*, gr. i, repeated and gradually increased till nausea supervenes. Gr. vi to gr. xij will vomit. Of the *acetum scillæ* (℥iv to diluted acetic acid Oij), the dose is, ♏xxx to f℥ij; of the *oxymel* (vinegar of S., mixed with honey), f℥i–ij; of the *syrup*, f℥i; of the *compound syrup*, known as *hive-syrup* (which contains also seneka and tartar emetic, and is much used for children in croup), 10 drops to f℥i, according to the age; of the *tincture* (℥iv to diluted alcohol Oij), 20 to 40 drops.

COLCHICUM.

Colchici Radix, Colchicum Root; Colchici Semen, Colchicum Seed.

Colchicum autumnale, or Meadow-Saffron (*Nat. Ord.* Melanthaceæ), is a small, perennial, bulbous plant, which grows wild, in moist meadows, in England and other temperate parts of Europe. The bulb, or corm, as it is botanically termed, appears in mid-summer as a lateral offset from the corm of the preceding year, and sends up the flower-stem in the autumn—the leaves and fruit following in the succeeding spring. The leaves are broadly lanceolate, about five inches long; the flowers of a lilac or light-purple colour; and the fruit oblong, elliptical and three-celled.

The CORMS and SEEDS are the portions used medicinally. The corms are gathered in July, just before the sprouting of the flower from the young corm. They are somewhat like tulip bulbs in appearance, but solid and not composed of scales. They are covered by an external brown membrane, and an inner reddish-yellow one. Internally, they are white, fleshy, and solid, and contain an acrid, bitter, milky juice. As found in the shops, they are in the dried state, sometimes whole, but usually cut into transverse slices about an eighth of an inch thick, with a notch on one side, and deprived of the outer brown mem-

brane. They have a hircine odour, and a bitter, hot, and acrid taste. The seeds are brown, about the size of black mustard-seeds, inodorous, and have a bitter, acrid taste; they are less apt to be injured by drying than the corms.

Colchicum corms and seeds yield their virtues to vinegar and alcohol: they both contain a peculiar alkaloid active principle, termed *colchicia*, which is a powerful poison.

Physiological Effects.—Colchicum is a local irritant. Taken internally, in small doses, it stimulates the secretions generally; in larger doses, it produces nausea, vomiting, and purging, and commonly a reduction of the frequency of the pulse; in excessive doses, it is an acro-narcotic poison. Although placed among the diuretics, colchicum does not evince a more decided action on the kidneys than on other secretions, as those of the skin, liver, and mucous membranes.

Medicinal Uses.—Colchicum has long enjoyed a high reputation in the treatment of gout; and, although its *modus medendi* is rather obscure, it is universally admitted to possess a more decided control over the disease than any other remedy. Its efficacy is probably owing to a combined sedative, anodyne, and ecritic action. It is usually administered in repeated doses, till an effect is produced on the bowels; Epsom salt and magnesia are often combined with it, as in the celebrated *Scudamore's draught* (*magnesia*, gr. xv to xx, *sulphate of magnesia* ʒi to ʒij; *vinegar of colchicum* fʒi to fʒij, in any pleasant vehicle). When it is desired to act on the kidneys and skin rather than the bowels, opiates are sometimes given with it. In rheumatism, colchicum is also employed, but with less marked success than in gout. It has been occasionally resorted to as a diuretic in dropsy, as a sedative in febrile and inflammatory diseases, as an anthelmintic, as an expectorant, and in some nervous affections.

Administration.—Dose of the corm or seeds, in *powder*, gr. ij to gr. viij; the seeds are preferred. The liquid preparations, which are more generally used than the powder, are:—

The *vinegar* (*acetum*) (℥ij of the root to diluted acetic acid Oij), dose, 30 drops to f℥ij; *wine of the root* (℔j to sherry wine Oij), dose, ♏x to f℥i; *wine of the seeds* (℥iv to wine Oij), dose, f℥i–ij; *tincture of the seeds* (℥iv to diluted alcohol Oij), dose, f℥ss to f℥ij. An *acetic extract of the root* is also employed—dose, gr. i–ij.

VERATRUM ALBUM—WHITE HELLEBORE.

This is an herbaceous plant (*Nat. Ord.* Melanthaceæ) of the mountainous parts of Europe. The RHIZOMA is the officinal portion. It occurs in small, rough, wrinkled cylindrical or conical pieces, blackish externally and whitish internally; its odour, in the dried state, is feeble, its taste at first sweetish, afterwards bitterish, acrid, and burning. The medicinal virtues reside in an alkaloid called *veratria*.

Effects and Uses.—White hellebore is an active acrid medicine, resembling colchicum in its effects on the secretions and nervous system, and was formerly much employed in the same circle of diseases; the violence of its operation has led, however, to its abandonment from general use as an internal remedy. Dose, gr. i to ℈i. A *wine* is officinal, but is little used; the *ointment* is applied in itch. The *powder* is employed as an errhine.

VERATRUM VIRIDE—AMERICAN HELLEBORE.

V. Viride, American Hellebore, Indian Poke, or Poke Root (*Nat. Ord.* Melanthaceæ), is an indigenous swampy plant, from 3 to 6 feet high, with greenish-yellow flowers. The RHIZOMA, which is the officinal portion, bears a close resemblance to that of V. album, in both sensible properties and medicinal effects and uses, and is thought also to contain *veratria*. Dose, gr. ij to gr. iv, of the *powder;* of a *tincture* (℥vi to alcohol Oi), f℥ss to f℥i; of an *extract*, gr. ss to gr. i.

VERATRIA is usually obtained from Cevadilla, the seeds of

Veratrum Sabadilla (*Nat. Ord.* Melanthaceæ), a plant of Mexico. It is a grayish or brownish-white alkaline pulveru-

APOCYNUM CANNABINUM—INDIAN HEMP.

(See page 207.)

Fig. 19.

lent substance, without odour, and of a very acrid taste; scarcely soluble in cold water, but readily soluble in alcohol.

Its *effects* are locally those of an irritant, and when rubbed on the skin it causes a sensation of heat and tingling. Taken internally, in small doses, it stimulates the secretions, and, in excessive doses, is a violent poison. It has been used *internally* in nervous disorders, dropsies, gout, rheumatism, &c., in doses of gr. $\frac{1}{12}$ to gr. $\frac{1}{6}$, repeated; but its principal employment is *external*, in the form of *ointment* (gr. x–xx to lard ℥i), or dissolved in alcohol, as an application to rheumatic and neuralgic parts.

APOCYNUM CANNABINUM—INDIAN HEMP.

This is an indigenous herbaceous plant (*Nat. Ord.* Apocynaceæ), growing to the height of two or three feet, with oblong-ovate leaves, and small, greenish, campanulate flowers. The ROOT is the officinal portion: it is of a yellowish-brown colour when young, and of a dark-chestnut when old, has a strong odour, and a nauseous, acrid, bitter taste. The fresh root, when wounded, pours out a milky juice: it yields its virtues to water and alcohol, and contains tannic and gallic acids, gum, resin, a bitter principle, &c.

Effects and Uses.—Indian Hemp (which is not to be confounded with Cannabis Indica, p. 56), is an emeto-cathartic, diuretic, diaphoretic, and sedative. It is chiefly employed in the treatment of dropsy, in the form of *decoction* (℥ss to water Oiss, boiled to Oj), of which f ℥j–ij may be taken two or three times a day.

TARAXACUM—DANDELION.

Leontodon Taraxacum, or Dandelion (*Nat. Ord.* Asteraceæ), is a small herbaceous, perennial plant, common to most parts of the world, and found abundantly throughout the United States. It has a fusiform root, which sends up numerous long, sinuated, bright-green leaves, and flower-stems, about six inches high, bearing golden-yellow flowers. The ROOT

Fig. 20.

is the officinal portion. In the fresh state, it is several inches long, branched, fleshy, of a light-brown colour externally, whitish within, and abounds in a milky juice; the *fresh* root is preferable for use. When dried, it is shrunken, wrinkled, and brittle. It is without smell, but has a bitter taste. Boiling water extracts its virtues, which depend on a peculiar bitter crystallizable principle, termed *taraxacin*, soluble in boiling water, alcohol, and ether.

Effects and Uses.—Taraxacum is diuretic and slightly aperient, with some tonic action, and a special determination to the liver. It is a valuable remedy in hepatic dropsies, and is also employed in dyspepsia, accompanied by derangement of the liver. It is given in the form of *infusion* (ʒij to boiling water Oi),—dose fʒij, three times a day; and *extract* (which should not be kept above a year),—dose, ϑi to ʒi three times a day.

ERIGERON—FLEABANE.

Three varieties of *Erigeron* are officinal: E. Canadense, or Canada Fleabane, E. heterophyllum, or Various-leaved Fleabane, and E. Philadelphicum, or Philadelphia Fleabane (*Nat. Ord.* Asteraceæ). They are herbaceous indigenous

plants, two or three feet high, with ovate or lanceolate, toothed leaves, and white, blue, or purple flowers. The whole HERB is officinal. *Canada Fleabane* has an agreeable odour, and a bitter, acrid, somewhat astringent taste. It contains bitter extractive, tannic and gallic acids, and volatile oil; and is diuretic, tonic, and astringent. *Various-leaved* and *Philadelphia Fleabane*, popularly known as *scabious*, have an aromatic odour, and a slightly bitterish taste. Their most striking medicinal action is diuretic, and they have long been favourite remedies in dropsical and nephritic affections. An *infusion* or *decoction*, to the amount of a pint (containing ℥i of the herb), may be taken daily.

JUNIPERUS—JUNIPER.

The FRUIT, or berries, of Juniperus communis (*Nat. Ord.* Pinaceæ), an evergreen European shrub, naturalized in the United States, are used as adjuvants to the more active diuretics. When dried, they are about the size of a pea, and of a blackish-purple colour. Their virtues depend on a *volatile oil* (OLEUM JUNIPERI), the dose of which is five to fifteen drops, two or three times a day. The *compound spirit of Juniper* (a tincture of the oil, containing also the oils of caraway and fennel) is a pleasant addition to stimulating diuretic infusions,—dose, f℥i–ij.

CAROTA—CARROT SEED.

Daucus Carota, or Wild Carrot (*Nat. Ord.* Apiaceæ), is a very common indigenous plant, which is found also wild in Europe. It has a biennial spindle-shaped root, an erect branching stem two or three feet high, tripinnate leaves with narrow, pointed leaflets, and small white flowers, arranged in umbels. The FRUIT or SEEDS, which are the officinal portion, are light, of a brownish colour, an oval shape, convex and bristly on one side, and flat on the other. They have an

aromatic odour, a warm, pungent, bitterish taste, and contain a volatile oil, on which their virtues depend.

Effects and Uses.—Carrot-seeds are aromatic and diuretic, and are a good deal employed in dropsical and nephritic affections, agreeing well with the stomach, from their aromatic oil. The infusion is a popular remedy for the relief of strangury from blisters. Dose, ʒss to ʒi, or an *infusion* (℥ss to water Oi), *ad libitum*.

The ROOT of this plant possesses the same properties as the seeds. The ROOT of the cultivated plant, the well-known garden carrot, is employed as an application to sloughing ulcers.

BUCHU.

This name is given to the LEAVES of Barosma crenata and other species of Barosma (*Nat. Ord.* Rutaceæ), shrubby plants, growing at the Cape of Good Hope. As found in the shops, buchu leaves are rather less than an inch long, from three to five lines broad, elliptical, lanceolate-ovate or obovate, sometimes pointed, sometimes blunt, notched and glandular at the edges, and of a green colour, paler on the under surface. They have a strong, aromatic odour, and a bitterish taste, like that of mint. Water and alcohol extract their virtues, which depend on a *volatile oil* and *extractive*.

Effects and Uses.—Buchu is a gentle stimulant to the secretions generally, particularly to the kidneys and urinary mucous membranes; it may be made to act also as a diaphoretic. It is employed in chronic catarrh of the urethra and bladder, nephritic complaints, retention or incontinence of urine—as a diuretic, in dropsies—and as a diaphoretic in rheumatic and cutaneous complaints. Dose, of the *powder*, gr. xx–xxx; of the *infusion* (℥i to boiling water Oi), f℥i–ij. A *tincture* and *fluid extract* are also recommended.

CANTHARIS—SPANISH FLIES.

The properties, &c., of *cantharides* will be noticed fully

under the head of *Irritants* (subdivision *Epispastics*). Taken internally, they sometimes prove diuretic, and generally excite irritation of the genito-urinary passages, as strangury, priapism, &c.; and in over-doses, act as an acro-narcotic poison. They are employed in atonic dropsies, incontinence of urine, amenorrhœa, seminal weakness, impotence, &c. Dose, gr. i–ij, twice a day, in pill. They are most commonly administered in *tincture* (℥i to diluted alcohol Oij),—dose, gtt. x, or more, three or four times a day, till strangury supervenes.

The following medicines, though less frequently resorted to than the foregoing, possess very decided diuretic properties, and may be employed with advantage in the treatment of dropsical and nephritic affections.

The FRESH TOPS (and also the *seeds*) of CYTISUS SCOPARIUS, or BROOM (*Nat. Ord.* Fabaceæ), a European shrub, cultivated in our gardens.

The ROOT of PETROSELINUM SATIVUM, or PARSLEY (*Nat. Ord.* Apiaceæ), a European plant, cultivated in our vegetable gardens, for its leaves.

The ROOT of COCHLEARIA ARMORACIA, or HORSE-RADISH (*Nat. Ord.* Brassicaceæ), a European plant, cultivated here for its root, which is used as a condiment.

ORDER V.—BLENNORRHETICS.

Blennorrhetics (from βλεννα, *mucus*, and ρεω, *I flow*), are medicines which promote the secretion of the mucous membranes. They are employed therapeutically in morbid conditions of these membranes, with a view to the restoration of healthy action, in cases of deficient, abnormal, or excessive secretion.

When administered with the object of stimulating the secretion of mucus from the bronchial or laryngeal membrane,

this class of agents is termed *expectorants*. They are prescribed in the subacute and chronic forms of bronchitis and laryngitis, and in the declining stages of the acute forms of these affections and of pneumonia. In the early or inflammatory stages of acute bronchitis and laryngitis, the stimulating expectorants are inadmissible, until nauseants and depletion have been reorted to.

The blennorrhetics are less employed in gastro-enteric affections than in those of other mucous membranes, owing to their tendency to produce catharsis. Several of the oleo-resins are, however, used with advantage in certain forms of chronic diarrhœa, and the oil of turpentine is highly esteemed in the treatment of the diarrhœa of typhoid fever.

The oleo-resinous articles of this group are extensively employed in diseases of the urino-genital mucous membranes—gonorrhœa, gleet, leucorrhœa, incontinence of urine, cystitis, calculous affections, &c.

The following are the articles chiefly resorted to for their influence on the mucous membranes.

SENEGA—SENEKA.

Polygala Senega, or Seneka Snakeroot (*Nat. Ord.* Polygalaceæ), is a small indigenous plant, found in all parts of the United States, but most abundantly in the South and West. It has a perennial, branching root, several erect, annual stems, about a foot in height, alternate lanceolate leaves, and small, whitish flowers, arranged in a terminal spike. The ROOT is the officinal portion. It occurs in the shops in twisted pieces, varying in thickness from the size of a quill to that of the little finger, attached to a knotty head, and marked with a ridge along their whole length, and numerous annular protuberances. The cortical portion is hard, resinous, of a yellowish-brown colour, and *contains the active qualities of the root.* The central ligneous portion is white and inert. The odour

Fig. 21.

of seneka is peculiar and disagreeable, but faint in the dried root; the taste is at first mucilaginous and sweetish, but afterwards becomes acrid and very irritating.

The virtues of seneka are extracted by boiling water and alcohol. It contains a peculiar acrid acid principle called *polygalic acid*, on which its activity chiefly depends.

Effects and Uses.—Seneka, in small doses, is an active excitant of the secretions generally, and in large doses proves emetic and cathartic. It is chiefly prescribed as a stimulating expectorant in chronic and subacute bronchial affections, and in the latter stages of acute bronchitis, pneumonia, &c. As an ingredient in the *compound syrup of squill*, it is much employed in the treatment of croup, but, except in some such combination with tartar emetic or other emetic-nauseant, it is

scarcely admissible in the early stages of this disease. Seneka is also thought to possess emmenagogue properties, and is highly extolled by many practitioners in the treatment of amenorrhœa. It has been occasionally used as a diuretic in dropsies, and, in emeto-cathartic doses, has been found useful in rheumatism.

Administration.—Dose, in *powder*, gr. x to ℈i; but it is chiefly given in *decoction* (℥i to water Oiss, boiled to Oi), dose f℥ij, three or four times a day. A *syrup* is also used, in the dose of f℥i–ij.

CIMICIFUGA—BLACK SNAKEROOT.

Cimicifuga racemosa, Black Snakeroot, or Cohosh (*Nat. Ord.* Ranunculaceæ), is a very common indigenous perennial plant, growing to the height of from four to eight feet, with ternate leaves, oblong-ovate, incised, and toothed leaflets, and small, white flowers disposed in a long raceme. The ROOT is the part employed. It consists of a rugged, blackish-brown caudex, from a third of an inch to an inch in thickness, often several inches in length, furnished with numerous slender radicles. Internally, its colour is whitish; it has a peculiar, faint, disagreeable odour, and a bitter, somewhat astringent taste. It imparts its virtues to boiling water, and contains gum, starch, resin, tannic and gallic acids, salts, and various other matters.

Effects and Uses.—The effects of cimicifuga are not very accurately known, but it is undoubtedly an active stimulant of the secretions, particularly those of the mucous membranes, skin, and kidneys, with, probably, in large doses, a sedative and antispasmodic action on the nervous system. It has been employed with great advantage as an expectorant in chronic bronchial affections, and even phthisis pulmonalis, and has been also used as a diaphoretic in rheumatism, and as a diuretic in dropsies. As an antispasmodic in chorea, it enjoys a

Fig. 22.

high reputation, and it is also recommended in the spasmodic forms of hysteria, particularly when connected with amenorrhœa. A saturated alcoholic solution has been used, with good effect, as an application to the eyelids in ophthalmia.

Administration.—Dose, in *powder*, ℈i to ʒi; a *decoction*

(℥i to water Oi), is given in the dose of Oss to Oi through the day; a *tincture* (℥iv to diluted alcohol Oi), in the dose of f℥i–ij.

ALLIUM—GARLIC.

Allium sativum (*Nat. Ord.* Liliaceæ), is a small, perennial, bulbous plant, which grows wild in the south of Europe, and is cultivated in all parts of the world. The BULB is the portion used. As found in the shops, it is somewhat spherical in form, about an inch in diameter, with a portion of the stem attached, covered with a white, membranous envelope, and consists of five or six smaller bulbs, of a curved, oblong shape, called *cloves* of garlic. They have a strong, irritating, characteristic odour, and a bitter, acrid taste. Water, alcohol, and vinegar extract their virtues, which depend on an *essential oil*, which is of a yellow colour, very volatile and irritating.

Effects and Uses.—Garlic is a local irritant and rubefacient, and, taken internally, quickens the circulation and stimulates the secretions generally. It is a good deal employed as an expectorant in chronic and subacute catarrhal affections, particularly in infantile cases, and, occasionally, as a stomachic in flatulence, and as a diuretic in atonic dropsies. *Externally*, it is used as a revulsive rubefacient to the feet, as a resolvent of indolent tumours, and as a liniment in infantile convulsions.

Administration.—A clove may be swallowed entire, or cut into small pieces. Dose of the *fresh bulbs*, ℥i–ij, in pill; of the *juice* f℥ss, mixed with sugar; of the *syrup* (made with diluted acetic acid and sugar), f℥i, for children.

SCILLA—SQUILL.

Squill, already noticed among diuretics, is one of the most powerful and valuable stimulating expectorants in the Materia Medica. (For properties, doses, preparations, &c., see p. 201.)

TEREBINTHINA—TURPENTINE.

The term *turpentine* is applied to liquid or concrete vegetable juices, consisting of resin combined with a peculiar essential oil, called *oil of turpentine*. Two kinds of turpentine are recognised by the U. S. Pharmacopœia:—1. The *common American* or *white turpentine*, which is procured chiefly from Pinus palustris (*Nat. Ord.* Pinaceæ), a large indigenous evergreen tree of our Southern States, where it is called *Long-leaved Pine*, *Yellow Pine*, and *Pitch Pine*, and in part also from Pinus Tæda, found in Virginia, and other species of Pinus. 2. *Canada turpentine*, kept in the shops, under the name of *Canada balsam* or *balsam of fir*, the product of Abies balsamea, the American Silver Fir, or Balm of Gilead Tree (*Nat. Ord.* Pinaceæ), a handsome tree about 40 feet in height, inhabiting the northern portions of North America. Many other varieties of turpentine are known in commerce, as *Bordeaux turpentine*, *Venice turpentine*, *Chian turpentine*, &c.

White turpentine comes from North Carolina and other Southern States, and is collected from excavations made in the trunks of the trees, into which the turpentine runs in the mild weather. It is yellowish-white, and somewhat translucent, semi-fluid in summer, firm and hard in winter, but becoming permanently hard by exposure to the air, and has a peculiar aromatic odour, and a warm, pungent, bitterish taste. *Canada turpentine* comes from Canada and Maine. It is procured by breaking the vesicles, which are found between the bark and wood of the trees, and collecting the liquid contents in a bottle. When fresh, it has the consistence of honey, but gradually solidifies by age. It is yellow, transparent, tenacious, of a peculiar, pleasant terebinthinate odour, and a slightly bitter, acrid taste.

Chemical Constituents.—The turpentines yield, by distillation, a *volatile oil*, known as oil of turpentine, and leave a

residue consisting exclusively of *resin*. Both the *oil* and *resin* are officinal. The turpentines are inflammable, nearly insoluble in water, but almost wholly soluble in alcohol and ether.

Physiological Effects.—The local operation of the terebinthinates is irritant. When applied to the skin, they produce a rubefacient effect, and when swallowed, *in large doses*, promote the peristaltic motion of the intestines. Taken internally, in small doses, they are absorbed, and prove excitant to the vascular system and the secretions generally, especially the mucous membranes; they communicate a violet odour to the urine. The activity of the terebinthinates depends on their *volatile oil*.

Medicinal Uses.—Turpentine is employed chiefly in diseases of the various mucous membranes, as gonorrhœa, gleet, leucorrhœa, cystorrhœa, chronic bronchitis, and chronic mucous diarrhœa. It is also used in rheumatic complaints; and, in cathartic doses, in cases of ascarides, constipation, and colic.

Administration.—Dose, as a *blennorrhetic*, ℈i to ʒi, in *pill*, *emulsion*, or *electuary*; as an *anthelmintic* or *cathartic*, ʒss to ʒi, in emulsion. The *white turpentine* is generally used in this country.

Oleum Terebinthinæ—Oil of Turpentine—commonly called *Spirit of Turpentine*, is the active principle of turpentine, obtained by distillation. It has already been noticed under the head of aromatic stimulants (p. 141). Its effects and medicinal uses are the same as those of turpentine, for which it is usually substituted in practice. Locally, it acts as a rubefacient. When swallowed in large doses, as f ʒi–ij, it commonly passes off by the bowels; and, taken in small doses, it is absorbed, and stimulates the circulation and the secretions of the mucous membranes, kidneys, and skin. It often produces strangury and considerable irritation of the

urino-genital passages. In large doses, it is employed as an anthelmintic and cathartic, and is much used as a clyster for the relief of tympanitis. In *small doses*, it is greatly prescribed in chronic discharges from the various mucous membranes; in the latter stages of typhoid fever as a combined stimulant and blennorrhetic; as a diaphoretic in rheumatism and neuralgia; in infantile diabetes, nephritic disorders, dropsy, &c. As a *rubefacient*, it is a valuable counter-irritant in numerous diseases.

Dose, gtt. v–xxx, repeated, as a *blennorrhetic stimulant*; f℥ss–f℥i, as a *cathartic enema*, or *anthelmintic*, in emulsion. *Linimentum terebinthinæ* (oil of turpentine Oss, melted with resin cerate ℔j), is used as an application to burns and scalds.

Pix Liquida—Tar,—is an impure turpentine, procured by burning, from the wood of Pinus palustris, and other species of Pinus. It is a brownish-black, viscid, semi-liquid substance, of a peculiar empyreumatic odour, and a bitterish, resinous, somewhat acid taste—soluble in alcohol, ether, and the volatile and fixed oils. It consists of resin, united with acetic acid, oil of turpentine, and various volatile empyreumatic products. By distillation, it yields *pyroligneous acid* and *oil of tar*—the residuum being pitch. The *oil of tar* contains, besides oil of turpentine, *creasote* (see p. 124), and other principles.

Effects and Uses.—Tar resembles the turpentines in its effects, and is employed in chronic catarrhal affections and other diseases of the mucous membranes. Its vapour has been employed in bronchitis; and, externally, it is an excellent application to tinea capitis, psoriasis, and other cutaneous affections. Dose, ℥ss to ℥i, several times a day, in pill or electuary; or *tar water—aqua picis liquidæ*—(made by digesting tar Oi with water Cong. ss), may be taken in the quantity

of Oi–ij, daily. The *ointment* (*unguentum picis liquidæ*), is made by adding tar to melted suet.

RESINA—RESIN—commonly called *rosin*—is the residuum after the distillation of the oil from white turpentine. It is a yellowish-brown, semi-transparent, solid, brittle substance, with a slight terebinthinate odour and taste—insoluble in water, soluble in ether, alcohol, and the essential oils, readily uniting by fusion with wax and the fixed oils, and forming soluble soaps with alkalies. When agitated with water, in a state of fusion, it becomes opaque and *white*. It is not used *internally*, but is extensively employed in the formation of *plasters* and *ointments*, to which it communicates great adhesiveness and slightly stimulant properties.

Ceratum Resinæ (*Resin Cerate*), commonly called *basilicon ointment*, is made by melting resin, lard, and yellow wax together: it is an excellent mild stimulant application to burns, blistered surfaces, &c. *Compound Resin Cerate*, made by melting resin, suet, yellow wax, turpentine, and flaxseed oil together, is a good stimulant cerate, very popular under the name of *Deshler's Salve*. *Emplastrum Resinæ* (*Resin Plaster*), made by melting one part of resin with six parts of lead plaster, is the well-known *adhesive plaster*, used for retaining the edges of wounds in contact, &c.

COPAIBA.

Copaiba is the JUICE of several species of Copaifera (*Nat. Ord.* Amyridaceæ), large trees peculiar to South America. C. officinalis has been thought to be a principal source of copaiba, but it probably yields little of that now in use. The juice is obtained from incisions in the stems of the trees: as it first exudes, it is clear, colourless, and very thin, but it soon acquires a thicker consistence, and a yellowish hue. As found in the shops, it is a clear, transparent liquid, of the

consistence of olive oil, of a pale-yellow colour, a peculiar agreeable smell, and a pungent, nauseous, acrid taste.

Copaiba is insoluble in water, but soluble in alcohol, ether, and the volatile and fixed oils; with alkalies and alkaline earths, it forms a soap. It is, chemically, an *oleo-resin*, with a minute portion of acetic acid: the VOLATILE OIL is officinal; the *resin* possesses acid properties, and is called *copaivic acid*. By exposure to the air, copaiba gradually becomes darker and thicker, and finally hard and brittle, owing to the volatilization and oxidation of its oil. Copaiba was formerly called a *balsam*, but this title is incorrect, as it contains no *benzoic* or *cinnamic acid*.

Effects and Uses.—The effects of copaiba are very analogous to those of the terebinthinates. In large doses, it proves cathartic, and occasionally emetic, and, in small doses, it is absorbed, communicating its peculiar odour to the secretions and exhalations, and stimulating the secretions from the mucous membranes and kidneys: it is also a gentle excitant to the circulatory system. It is employed in diseases of the mucous membranes, particularly those of a chronic character, as chronic bronchitis, chronic diarrhœa, leucorrhœa, gonorrhœa, gleet, catarrh and irritation of the bladder, &c. As a remedy in gonorrhœa, it has long enjoyed great popularity, and is given in all stages of the disorder, though in very inflammatory cases it occasionally produces unpleasant symptoms.

Administration.—Dose, gtt. xx to f℥i, three times a day, in *emulsion*, with some aromatic water, or in pills made with magnesia, or enclosed in *capsules* of gelatin. It is also administered as a clyster, in *emulsion*. Cubebs is frequently prescribed with copaiba, in the treatment of gonorrhœa.

OLEUM COPAIBÆ—OIL OF COPAIBA—obtained by distillation from the oleo-resin, is usually colourless, with the odour and taste of copaiba, and produces the same effects on the system. Dose, gtt. x–xv, in *emulsion*, or dropped on sugar.

CUBEBA—CUBEBS.

Cubebs are the BERRIES of Piper Cubeba (*Nat. Ord.* Piperaceæ), a climbing, perennial plant of Java and other parts of the East Indies. The berries are gathered for use when unripe, and are dried. They are about the size of a small pea, of a blackish or grayish-brown colour, a reticulated surface, and furnished with a stalk two or three inches long. The shell is hard, and contains a blackish seed, which is white and oily within. The odour of cubebs is aromatic; the taste warm, acrid, and camphoraceous. They deteriorate by age, most rapidly in powder, owing to the escape of their volatile oil. Their most important constituents are a VOLATILE OIL (which is officinal), a principle analogous to piperin, called *cubebin*, and *resinous* matter. The OIL is the most active ingredient, but the *resin* and *cubebin* contribute also to the medicinal virtues of the drug.

Effects and Uses.—In large doses, cubebs, like the other oleo-resins, produce more or less gastro-enteric disturbance. In small doses, they are absorbed, and act as a gentle excitant to the vascular system, with a very decided stimulant action on the mucous surfaces, particularly those of the urino-genital apparatus; they also frequently prove diuretic. They are chiefly used in the treatment of gonorrhœa, and should be given in the early stage of the disease. In other mucous discharges, as chronic catarrh with profuse secretion, leucorrhœa, gleet, &c., cubebs have been also employed with advantage.

Administration.—Dose of the *powder*, ʒi–iij, three times a day, in gonorrhœa; in chronic mucous disorders, smaller doses are given. The OIL is often employed, but it does not possess the full virtues of cubebs—dose, gtt. x–xij, to be repeated and gradually increased; it may be taken in emulsion, or dropped on sugar, or made into gelatinous capsules with oil of copaiba. The *fluid extract* (ethereal), contains both the volatile oil and resin, with a portion of cubebin, and is an ex-

cellent preparation—dose, ♏v–xxx, suspended in water; of the *tincture* (℥iv to diluted alcohol Oij), the dose is f℥i–ij, three times a day.

PAREIRA—PAREIRA BRAVA.

Pareira Brava is a ROOT, brought from Brazil, which is generally supposed to be derived from Cissampelos Pareira (*Nat. Ord.* Menispermaceæ), a climbing plant of the West Indies and South America. It comes to us in wrinkled, twisted or forked, cylindrical pieces, of variable thickness and length, covered with a thin, grayish-brown bark. The interior is ligneous, yellowish, porous, inodorous, and of a sweetish, nauseous, bitter taste. It imparts its virtues to water, and contains a bitter alkaline principle, resin, fecula, &c.

Effects and Uses.—Pareira Brava is chiefly employed in chronic diseases of the urinary passages, particularly chronic inflammation or irritation of the bladder, with morbid secretion. It is said to be also tonic, aperient, and diuretic. *Dose*, in substance, ℥ss to ℥i. But it is more conveniently given in *infusion* (℥vi to boiling water Oj), dose, f℥i–ij—or *watery extract*, dose, gr. x to ℥ss.

MYRRHA—MYRRH.

Myrrh is the CONCRETE JUICE of Balsamodendron Myrrha (*Nat. Ord.* Amyridaceæ), a small tree of Arabia Felix; the juice exudes spontaneously and concretes upon the bark. It is imported from the Levant and the East Indies, and occurs in small, semi-transparent, reddish-yellow fragments or tears—sometimes agglutinated together in larger masses—of irregular shape and size, an agreeable, peculiar odour, and a bitter, aromatic taste. It is brittle and pulverizable, has a resinous fracture, and makes a light-yellowish powder. Inferior kinds of myrrh, commonly called *India myrrh*, are darker and less translucent and odorous. Myrrh is a gum-resin, containing

also a little volatile oil. It forms with water an emulsion, and is soluble in alcohol and ether.

Effects and Uses.—Myrrh is a stimulant expectorant and emmenagogue, with some tonic effects. It is prescribed in chronic catarrhal and asthmatic affections, in which a combined corroborant and expectorant effect is desirable; and also in chlorosis, amenorrhœa, &c. Chalybeates and aloes are frequently united with it in uterine affections. Locally, it is a good application to spongy gums, aphthous sore mouth, &c.

Administration.—Dose, gr. x to ʒss, in powder or pill, or suspended in water, as in *Mistura Ferri Composita* (see p. 101). The *tincture* (ʒiv to alcohol Oiij), is chiefly employed externally—dose, internally, fʒss to fʒi. *Pills of Aloes and Myrrh*, and *Compound Iron Pills*, are officinal emmenagogue preparations of myrrh.

BENZOINUM—BENZOIN.

Benzoin is the CONCRETE JUICE of Styrax Benzoin, or Benjamin Tree (*Nat. Ord.* Styraceæ), a tall tree of Sumatra, Java, Borneo, and Siam. It is obtained by incisions in the bark, from which it readily exudes, afterwards hardening by exposure to the sun and air. Two kinds are known, the most valuable consisting chiefly of whitish *tears*, united by a reddish-brown connecting medium, the other of brown or blackish *lumps*, without tears, (known as *benzoin in sorts*). Benzoin is volatile, has a fragrant odour, a feeble, slightly aromatic taste, is soluble in alcohol and ether, and is precipitated from its alcoholic solution by water. Its chief constituents are *resin* and BENZOIC ACID, which places it among the BALSAMS; it contains also a trace of volatile oil.

Effects and Uses.—Benzoin is a topical irritant, and, after absorption, stimulates the mucous passages, especially the aërian membranes. It resembles myrrh in its effects, but is more acrid and stimulating, and less tonic. It is adapted to

chronic bronchial affections, but is seldom employed alone. As a fumigation in chronic laryngitis, it has been recommended by Trousseau and Pidoux. *Dose*, gr. x to ʒss. The *compound tincture* (containing also storax, balsam of Tolu, and aloes), is used as a stimulating expectorant—dose, ℥xxx to fʒij.

ACIDUM BENZOICUM—BENZOIC ACID—is obtained from benzoin by sublimation, or by the action of alkalies. It occurs in white, soft, feathery crystals, of a silky lustre, and not pulverulent. It has more or less of the odour of the balsam, a warm, acrid, and acidulous taste, is inflammable, sparingly soluble in cold water, rather soluble in boiling water, but perfectly soluble in alcohol, alkaline solutions, and fixed oils. It is a constituent of *the balsams*.

Effects and Uses.—Benzoic acid is a local irritant, acting on the general system as a stimulant, with a particular direction to the mucous surfaces, especially the aërian. *Dose*, gr. x. In its passage through the system, it abstracts the elements of gelatine-sugar, and passes out with the urine in the form of hippuric acid. It is little employed in medicine, except as an ingredient in *Paregoric Elixir* and *Compound Sulphur Ointment*.

BALSAMUM PERUVIANUM—BALSAM OF PERU.

Balsam of Peru is the JUICE of Myrospermum Peruiferum (*Nat. Ord.* Leguminosæ), a tree of Central America. It is obtained from incisions in the bark, and is collected on rags inserted in the openings, which are afterwards boiled in water, when the balsam settles at the bottom, and the water is poured off. A *white* balsam, obtained from the fruit of this tree by expression, and a tincture of the fruit in rum, are also known in Central America. Balsam of Peru has the consistence of honey, a dark, reddish-brown colour, a pleasant smell, a warm,

acrid taste, and is soluble in alcohol, and partially in boiling water. It is heavier than water. Its constituents are *resin*, *essential oil*, and *cinnamic acid*.

Effects and Uses.—It is a stimulating blennorrhetic and tonic, occasionally employed in chronic catarrhs, asthma, gonorrhœa, leucorrhœa, &c., but not much used in this country. Externally, it is applied to indolent ulcers. *Dose*, f℥ss, in emulsion.

BALSAMUM TOLUTANUM—BALSAM OF TOLU.

Balsam of Tolu is the JUICE of Myrospermum Toluiferum (*Nat. Ord.* Leguminosæ), a tree of the neighbourhood of Carthagena. It is procured from incisions in the trunk of the tree, and concretes in the vessels in which it is received. It has a soft, tenacious consistence, varying with the temperature, and by age becomes hard and resin-like. It is shining, translucent, of a reddish-brown colour, a fragrant odour, and a warm, sweetish, pungent taste. It is inflammable, entirely soluble in alcohol and essential oils, and, like the other balsams, yields its acid to boiling water. Its ingredients are *resin*, *volatile oil*, and *cinnamic acid*.

Effects and Uses.—It is a stimulant blennorrhetic and tonic, useful in chronic catarrhal affections, and, from its agreeable flavour, much employed as an ingredient of cough mixtures. The vapour of an ethereal solution of this balsam is inhaled with advantage for the relief of cough. *Dose*, gr. x–xxx, in emulsion, frequently repeated. A *syrup* is used as a vehicle for other medicines, and the *tincture* (℥iij to alcohol Oij) is added to cough mixtures—dose, f℥i–ij. It is an ingredient of the *compound tincture of benzoin*.

The following GUM-RESINS, previously noticed among *antispasmodics*, are employed as *expectorants*:

ASSAFŒTIDA—ASSAFETIDA—(see p. 70).

AMMONIACUM—AMMONIAC—(see p. 71).
GALBANUM—(see p. 71).

ORDER VI.—EMMENAGOGUES.

Emmenagogues (from ἐμμήνια, *the catamenia*, and ἀγωγος, *exciting*), are medicines which promote the menstrual discharge. This discharge may be suppressed from various causes, and hence very opposite classes of remedies are employed to restore it. Thus, when amenorrhœa depends on *anæmia*, the PREPARATIONS OF IRON are the most effectual emmenagogues; on the other hand, when it occurs in connexion with *plethora*, BLOODLETTING and EVACUANTS are resorted to. There are probably no articles which exert any specific influence upon the catamenia, as the discharge from the uterus is not one of the excretions through which medicinal agents pass out of the system. Medicines, however, which excite the pelvic circulation, and stimulate the organs in the neighbourhood of the uterus, have a tendency to increase or excite the menstrual discharge. They are

1. The *drastic cathartics*, as ALOES (p. 181), BLACK HELLEBORE (p. 188), &c.

2. Many of the *stimulating diuretics*, particularly CANTHARIS (p. 210).

3. Some of the *blennorrhetics*, particularly SENEKA (p. 212).

4. GUAIACUM (p. 197), usually classed with the *diaphoretics*.

Indirectly, the menstrual discharge is frequently promoted by

1. *Chalybeates*, which are the best emmenagogues in chlorotic and anæmic cases.

2. *Mercurials*, which prove emmenagogue from their influence in exciting the secretions generally.

The following articles are employed exclusively as emmenagogues.

SABINA—SAVINE.

Savine is the TOPS of Juniperus Sabina (*Nat. Ord*, Pinaceæ), a small, evergreen, bushy shrub of the South of Europe. They resemble closely the tops of *Juniperus Virginiana*, the indigenous *Red Cedar*, which are sometimes substituted for savine in the shops. The latter has a greenish colour, a strong, peculiar, heavy odour, and a bitter, nauseous resinous taste. Its virtues depend on a *volatile oil*, which is officinal.

Physiological Effects.—Savine is a local irritant. Taken internally, in medicinal doses, it stimulates the circulation and secretions, with a very decided action on the uterus. In large doses, it will cause vomiting, purging, and other symptoms of gastro-intestinal inflammation; and fatal results have sometimes occurred from its use, to provoke premature labour.

Medicinal Uses.—Savine is employed *internally*, almost exclusively as an emmenagogue, and is considered one of the best medicines that can be used to stimulate the action of the uterine vessels. Dr. Pereira pronounces it "the most certain and powerful emmenagogue of the whole materia medica." It has also been recommended in chronic rheumatism, and as an anthelmintic. *Topically*, it is used to keep up the discharge from blisters, to destroy warts, &c. Dose, in powder, gr. v–x; but it loses much of its oil by drying. *Ceratum Sabinæ* (two parts of savine to one part of resin cerate) is used to make perpetual blisters.

OLEUM SABINÆ—OIL OF SAVINE—is the preparation principally used internally,—dose, gtt. v–x.

RUTA—RUE.—The LEAVES of Ruta graveolens (*Nat. Ord.* Rutaceæ), a perennial European plant, are ranked among emmenagogues, and are used, popularly, to provoke abortion. Dose, gr. xv–xxx, two or three times a day. Of the *volatile oil*, the dose is gtt. ij–v.

RUBIA—MADDER.—The ROOT of Rubia tinctorum, or Dyer's Madder (*Nat. Ord.* Rubiaceæ), a European plant, is occasionally employed as an emmenagogue. Dose, ʒss, three or four times a day.

CLASS III.—HÆMATICS.

ORDER I.—HÆMATINICS.

This order (from αιματινα, *the red colouring matter of the blood*), includes only the PREPARATIONS OF IRON or CHALYBEATES. The chalybeates increase the number of blood-corpuscles, or the amount of hæmatin in the blood, and are employed therapeutically in diseases dependent on a deficiency of these elements. They belong eminently to *hæmatics* (or medicines which occasion changes in the condition of the blood); but, as they possess also general and local tonic effects, independent of their action on the blood, they have been classed and treated of among the *mineral tonics* (see p. 99).

ORDER II.—ALTERATIVES.

Alteratives may be defined to be medicines, which produce such a modification of the tissues, as enables the vital principle to restore healthy action, in morbid conditions of the system. Their effects are chiefly owing to a correcting influence on the quality of the circulating fluid. Thus, in inflammations, they diminish the abnormal quantity of fibrine in the blood, render its red corpuscles less disposed to aggregation, and decrease the number and adhesiveness of its white globules. In part, also, their curative operation is of a *substitutive* character, by setting up an *antagonistic* action, which takes the place of diseased action in the system.

Under the influence of alteratives, the secretions and exha-

lations are increased, the textures softened, inflammatory action is arrested, and morbid growths and deposits are absorbed. The exudation of plastic or coagulable lymph is checked, and, as a consequence, also the formation of false membranes. Visceral and glandular enlargements and indurations are diminished and often disappear, and phlegmonous inflammation, of every kind, is opposed.

If pushed too far, the alteratives soften and even destroy the textures, impoverish the blood so as to interfere with the functions of nutrition, and produce a condition of marasmus and cachexia.

Their principal therapeutic employment is as *antiphlogistics* or *resolvents*. The *mercurials* are chiefly employed in *acute* inflammations,—the preparations of *iodine*, *bromine*, &c., in *chronic* inflammations. In the treatment of acute inflammatory affections, mercurials are among the most important of our resources—especially in such as have a tendency to terminate in effusions of coagulable lymph. The iodic and bromic preparations are adapted to inflammations of a chronic character—and are particularly serviceable in indurations or enlargements of glands and organs.

By their *substitutive* or *antagonistic* action, alteratives are highly efficacious in the treatment of many diseases. In this way, syphilis is cured by the use of mercury, and intermittent fever, by the use of arsenious acid.

Owing to the injurious results which follow the prolonged exhibition of alteratives, they are to be administered with caution, and their effects closely watched.

HYDRARGYRI PRÆPARATA—PREPARATIONS OF MERCURY.

Metallic mercury is obtained chiefly from the sulphuret (*native cinnabar*). It is an odourless, tasteless, volatile, liquid metal, of a whitish colour.

While it retains the liquid metallic state, mercury is inert;

but, when taken internally, it sometimes combines with oxygen in the alimentary canal, and thus becomes active. In the state of vapour, it frequently proves injurious—in some instances, exciting salivation, ulceration of the mouth, &c.; in others, inducing a peculiar affection of the nervous system, termed *shaking palsy* (*tremor mercurialis*), which is often attended with loss of memory, vertigo, and other evidences of cerebral disturbance, and sometimes terminates fatally. Workmen in quicksilver are liable to this affection. It is supposed by some chemists, that the activity of mercurial emanations is owing to the oxidation of the metal, before it is inhaled; by others, that, in the finely-divided state, in which it exists as a vapour, it is in itself poisonous.

All the compounds of mercury possess activity. Some of them are violent caustic poisons; all of them are more or less irritant. When the mercurials are taken internally, their effects vary with the quantity administered. In *small* and *repeated* doses, their influence is first shown in an increase of the activity of the secernents and exhalants. The cutaneous, mucous, biliary, salivary, urinary, and, probably also, the pancreatic secretions, are all increased in amount, and, at the same time, the absorbent system becomes more active, so that accumulations of fluids, morbid enlargements, indurations, &c., will often disappear.

When mercury is given in *larger doses*, these effects are more intense. The mucous membrane of the mouth and the salivary glands not only take on increased secretory action, but become irritated and inflamed. The gums first show the mercurial influence, and are tender and tumefied; the whole mouth soon becomes sore; the tongue is swollen; and the saliva and buccal mucus flow abundantly, sometimes to the extent of several pints a day. At the same time, the breath acquires a peculiar fetidity, and the patient perceives a metallic taste in the mouth. The *resolvent* action of mercury is now

still more obvious than when its impression is milder, and considerable emaciation usually ensues, from the absorption of fat. These effects, which are termed *sialogogue* (from the excessive flow of saliva), are commonly produced for the cure of diseases, and, as a general rule, gradually subside, leaving the health unimpaired. When, however, the use of mercury is pushed too far, or it is administered to persons peculiarly susceptible of its action, a train of very serious symptoms ensues—as excessive salivation, ulceration of the mouth, sloughing of the gums, loosening of the teeth, and, occasionally, necrosis of the alveolar processes. A peculiar febrile condition, called *mercurial fever*, diarrhœa, skin diseases, neuralgia, rheumatism, disorder of the nervous system, and marasmus, are other symptoms which are frequently noticed after the abuse of mercury.

After its absorption, mercury produces several important changes in the quality of the blood. Immediately upon the establishment of salivation, the blood exhibits an inflammatory crust; but, at a later period, it loses colour, consistence, and coagulability, and the proportion of fibrine to serum becomes diminished. This *antiplastic* action on the blood renders mercurials valuable as antiphlogistic remedies.

Medicinal Uses.—Liquid metallic mercury was formerly administered to remove mechanical obstructions of the bowels, but its use has been abandoned. The preparations of mercury are employed therapeutically with various objects.

1. As *alteratives*,—with a view to their action on the secretions,—in dyspepsia and constipation, accompanied with torpor of the liver, in gout, rheumatism, chronic skin diseases, &c. Blue pill, mercury with chalk, and calomel, are employed as alteratives; the two former are preferred as least irritating.

2. As *sialogogues*. The chief value of mercurials is shown when a full impression is made on the system, as evidenced by salivation. This condition is usually established by the *in-*

ternal exhibition of mercurials, but it may be also produced by *friction* or by *fumigation*. In putting the system under the influence of mercury, it is not necessary to excite a high degree of ptyalism, though, in chronic diseases, it is often proper to keep up the effect for some time. During the maintainance of ptyalism, the patient should use warm clothing, avoid exposure to cold, and take light and nourishing food. If excessive discharge or ulcerations occur, astringent gargles, as brandy and water, solutions of chloride of soda or lime, alum, &c., may be employed. In cases of sloughing sores, nitrate of silver or the mineral acids should be applied. Gastro-enteric irritation is to be treated with laxatives and opiates. The mercurial cachexia requires change of air, generous diet, tonics, &c.

As sialogogues, mercurials are chiefly employed in fevers, inflammations, dysentery, cholera, and syphilis. In *fevers*, mercurials are used with a view both to their action on the secretions, and to their sialogogue influence. A gentle ptyalism is highly efficacious in typhoid or remittent fevers, but it is very difficult to bring the system under a mercurial impression, in febrile disorders. It is in *inflammations*, that the value of mercurials is most conspicuous. After depletion, the mercurial preparations, from their antiplastic action on the blood, are probably the most efficacious means at our command, for the relief of internal inflammations. They are *most* useful in inflammations of *serous* tissues, especially where these are connected with the exudation of coagulable lymph, and also where there is a tendency to the formation of false membrane, as in *plastic* croup. In scrofulous, malignant, or gangrenous inflammations, mercury is objectionable. In *dysentery* and *cholera*, mercurials are highly valuable remedies, and enter into nearly all the varieties of treatment adopted in these diseases. In *syphilitic* diseases, mercury has long been regarded as the only reliable curative agent. It is, perhaps,

unnecessary in the early treatment of the primary symptoms; but, after the system has been contaminated with the syphilitic virus, mercury is the most certain and rapid means of eradicating it. In hepatic and inflammatory *dropsies*, mercurials are employed with advantage, with a view to their action both on the secretions and absorbents. Where much debility exists, however, and in granular disease of the kidneys, mercurials are objectionable. The preparations of mercury have been exhibited as sialogogues in many other diseases, as paralysis, colica pictonum, chronic visceral diseases, particularly of the lungs and liver, &c. They must be always considered as contra-indicated in scrofulous or tuberculous subjects, in cases of malignant disease, in extensive suppurations, marasmus, &c.

Blue pill and calomel are the sialogogues principally resorted to, but other preparations, as the iodides, are employed in syphilis. In administering mercurials, for their sialogogue action, we sometimes observe a *cumulative* effect: they may be exhibited, particularly to children, for some time without result, when suddenly the most violent symptoms of mercurial saturation will be developed.

3. As *purgatives*. The employment of calomel, blue pill, and mercury with chalk, as cathartics and anthelmintics, has been previously noticed (see p. 192).

The following are the preparations of mercury which are employed medicinally:—

1. Metallic Mercury.—When intimately mixed with pulverulent or fatty bodies, mercury loses its liquid character—is said to be *killed*, *extinguished*, or *mortified*—and acquires medicinal activity. Its activity is probably owing to its reduction to a state of minute division, which enables it to enter into combinations in the stomach. The officinal preparations of metallic mercury are, *Pilulæ Hydrargyri* (*Mer-*

curial Pills), *Unguentum Hydrargyri* (*Mercurial Ointment*), *Emplastrum Hydrargyri* (*Mercurial Plaster*), *Hydrargyrum cum Cretâ* (*Mercury with Chalk*).

2. OXIDES.—*Hydrargyri Oxidum Nigrum* (*Black Oxide of Mercury*), *Hydrargyri Oxidum Rubrum* (*Red Oxide of Mercury*).

3. CHLORIDES.—*Hydrargyri Chloridum Mite* (*Mild Chloride of Mercury*, or *Calomel*), *Hydrargyri Chloridum Corrosivum* (*Corrosive Chloride of Mercury*, or *Corrosive Sublimate*).

4. IODIDES.—*Hydrargyri Iodidum* (*Iodide of Mercury*), *Hydrargyri Iodidum Rubrum* (*Red Iodide of Mercury*).

5. *Hydrargyrum Ammoniatum* (*Ammoniated Mercury*).

6. *Hydrargyri Nitras* (*Nitrate of Mercury*).

7. *Hydrargyri Sulphas Flavus* (*Yellow Sulphate of Mercury*).

8. SULPHURETS. — *Hydrargyri Sulphuretum Nigrum* (*Black Sulphuret of Mercury*), *Hydrargyri Sulphuretum Rubrum* (*Red Sulphuret of Mercury*).

PILULÆ HYDRARGYRI—MERCURIAL PILLS.—This preparation, generally known as *Blue Pills*, is made by rubbing mercury (℥i) with confection of roses (℥iss), till all the globules disappear; then adding powdered liquorice root (℥ss), and beating the whole into a mass. The trituration is now generally effected by machinery—usually by steam power. It is a soft, dark-blue mass, of a convenient consistence for making into pills. The mercury is in a state of minute division, and is chemically unaltered, though, perhaps, a very small portion of it is in a state of oxidation. Three grains of the pilular mass contain one grain of mercury. The preparation changes colour from being kept, becoming of an olive and even reddish tint, in consequence of the further oxidation of the metal. As it is often adulterated, it is important that it should be purchased of a reliable house.

Effects and Uses.—In full doses (gr. v–xv), blue pill acts as a *laxative;* when given for this purpose, it is usually followed in a few hours by a saline cathartic. In doses of gr. i–ij–iij, repeated at proper intervals, it is employed as an *alterative* or *sialogogue*, and is the favourite preparation for exciting salivation in chronic affections. When it moves the bowels, opium is combined with it.

UNGUENTUM HYDRARGYRI—MERCURIAL OINTMENT,—is made by rubbing mercury with suet and lard until the globules disappear. It is an unctuous, fatty body, of a bluish-gray colour, consisting of equal weights of *fatty matter* and finely divided *mercury*. A very small portion of protoxide is, perhaps, present, and, as the ointment becomes darker by age, a further oxidation of the mercury probably takes place.

Effects and Uses.—Mercurial ointment, when either swallowed or rubbed into the integuments, produces the constitutional effects of mercury; locally, it has but little irritant effect. It is scarcely ever used *internally* in the United States or Great Britain, though, in France, it is highly esteemed as a sialogogue, in the dose of gr. ij, repeated. *Externally*, it is used to mercurialize the system by friction, or applied to blistered surfaces; to disperse non-malignant tumours; as a dressing to syphilitic sores; to destroy pediculi; and to prevent suppuration and pitting in small-pox.

EMPLASTRUM HYDRARGYRI—MERCURIAL PLASTER,—is made by rubbing mercury with olive oil and resin previously melted together, till the globules disappear; and then adding melted lead plaster. It is used as a discutient of venereal and other enlargements, &c., and is applied to the side in chronic hepatitis: it may induce salivation. The *plaster of ammoniac with mercury* is more stimulating than the foregoing.

HYDRARGYRUM CUM CRETA—MERCURY WITH CHALK,—is prepared by rubbing three parts of mercury with five parts

of prepared chalk, till all the globules disappear. It is a grayish powder, containing mercury chiefly in a state of minute division. In full doses, it is a gentle laxative, milder even than blue pill; in smaller doses, it is an excellent alterative; and the chalk renders it antacid. It is chiefly employed as an alterative in infantile cases. Dose, for adults, gr. v–xx; for children, gr. ij or iij to gr. viij or x, in *powder*, and not in pills, as in the latter form the mercury becomes squeezed out of the chalk.

HYDRARGYRI OXIDUM NIGRUM—BLACK OXIDE OF MERCURY.—This preparation is obtained by agitating calomel (protochloride of mercury) in a solution of potassa; chloride of potassium is formed in solution, and protoxide of mercury (one equivalent of oxygen and one equivalent of mercury), precipitates. As first prepared, it is a greenish-black powder; but, on exposure to light or heat, it is converted into a mixture of metallic mercury and deutoxide, and becomes olive-coloured. It is odourless, tasteless, insoluble in water, but soluble in nitric and acetic acids. Its effects are alterative, sialogogue, and purgative, and it is one of the least irritating of the mercurial preparations—but it is little used internally, on account of the uncertainty of its composition. Dose, gr. ¼ to gr. i–ij, in pill. Externally, it has been employed as a fumigating agent; also, as an application to chancres and other sores, suspended in a weak solution of chloride of calcium, under the name of *black wash* (made extemporaneously by adding calomel ʒi, to lime-water Oj).

HYDRARGYRI OXIDUM RUBRUM—RED OXIDE OF MERCURY.—This is the *deutoxide* or *peroxide* of mercury (consisting of one equivalent of metal and two equivalents of oxygen). It is usually made by dissolving mercury in diluted nitric acid, with a gentle heat, by which nitrate of the deutoxide of mercury is formed; and the nitric acid is afterwards decomposed and driven off by calcination. The deutoxide of

mercury, which is commonly called *red precipitate*, occurs in small, shining scales, of a brilliant red colour, with a shade of orange. It has an acrid taste, and is nearly insoluble in water. Its effects are those of a powerful irritant, and, when taken internally, even in small doses, it excites vomiting and purging—in large doses, gastro-enteritis. It is rarely or never used internally (dose, gr. ¼–i); externally, it is applied as an escharotic, either in powder or ointment, to chancres, indolent ulcers, &c. The *yellow wash* (a favourite application to phagedenic venereal ulcers), consists of red oxide of mercury, suspended in a weak solution of chloride of calcium and caustic lime; it is made by adding corrosive sublimate (gr. ij, or less), to lime-water (f℥i). *Unguentum hydrargyri oxidi rubri* (*ointment of red oxide of mercury*), consists of one part of red oxide mixed with eight parts of simple ointment: it is a very useful stimulating ointment in indolent ulcers, porrigo, ophthalmia, &c.

HYDRARGYRI CHLORIDUM MITE—MILD CHLORIDE OF MERCURY.—This preparation, well known as *calomel*, consists of one equivalent of chlorine and of mercury, each, and is a protochloride of mercury. It is made by subliming a mixture of protosulphate of mercury and chloride of sodium (common salt); a double decomposition takes place, by which chloride of mercury and sulphate of soda are formed. The protosulphate of mercury is previously obtained by boiling mercury in sulphuric acid, and afterwards triturating the resulting bisulphate of the deutoxide with mercury. *Calomel*, as thus procured in mass, is liable to contain a little corrosive sublimate. It should be reduced to powder, and washed repeatedly with boiled distilled water, until the absence of a white precipitate with ammonia shows that the corrosive sublimate has been removed. With a view of obtaining calomel in a state of very minute division, its vapour is condensed in a receiving vessel filled with steam, whereby it takes the form of a very

fine powder, and is perfectly free from corrosive sublimate. The calomel thus prepared (known as *Jewell's* or *Howard's* calomel), is finer and more active than can be obtained by levigation and elutriation.

Calomel, as usually manufactured by sublimation, is in the form of white, fibrous cakes. As found in the shops, it is a light-buff or ivory-coloured powder, tasteless, inodorous, insoluble in water, alcohol, and ether, unalterable in the air, but blackening by long exposure to light. It should be kept in bottles painted black or covered with black paper. *Jewell's* calomel is a perfectly white powder. *When pure*, calomel is completely vaporizable by heat; it strikes a black colour, free from reddish tinge, with solutions of the fixed alkalies; and should not, when digested with water, form a white precipitate with ammonia, unless it contain corrosive sublimate.

Incompatibles.—The alkalies, alkaline earths, alkaline carbonates, soaps, and hydrosulphates, are *incompatible* with calomel. Nitro-muriatic acid should not be prescribed with it, for fear of generating corrosive sublimate. Preparations containing hydrocyanic acid, the chlorides of sodium and potassium, and muriate of ammonia, produce the same change. It is probable that calomel is in part converted into corrosive sublimate in the stomach, by the muriatic acid which it encounters.

Effects and Uses.—Calomel produces the effects of the mercurials, already described, and, in purgative doses, proves also a valuable anthelmintic. From the certainty and mildness of its operation, it is more employed than any of the other preparations of mercury, although blue pill, which if less certain, is milder, is preferred under some circumstances. Calomel has been frequently taken in very large doses, without any bad effects; but cases are recorded in which, in excessive quantity, it has acted as an irritant poison. As a *purgative*, it is employed in doses of gr. vi–xij, in fevers,

hepatitis, colica pictonum, dysentery, and many other affections; as an *anthelmintic*, in the same doses; and, in both cases, it is to be followed in a few hours by a saline draught, castor oil, or senna. Calomel is often given in combination with other cathartics, as jalap, rhubarb, aloes, scammony, colocynth, and gamboge. In very large doses, as ℈i to ʒss, or even more, it is said to possess *sedative* powers, and has been recommended in dysentery, cholera, puerperal fever, &c. As an *antiphlogistic*, in inflammatory cases, calomel is given in doses of gr. ½ to gr. i, every one, two, or three hours; as an *alterative*, in these doses, twice or thrice a day. In the dose of gr. i, frequently repeated, it is one of the best means of checking obstinate vomiting. It is frequently added to other medicines to increase their action on the secretions, as diuretics, antimonials, &c. To children, calomel may be given in proportionally larger doses than to adults, and it rarely salivates them. In infantile diarrhœa, very minute doses of calomel, as gr. $\frac{1}{8}$, $\frac{1}{12}$, $\frac{1}{16}$, every hour or two, are highly efficacious. *Externally*, calomel is applied in powder, as an errhine, in amaurosis; and, made into an ointment, it is an excellent application in a variety of cutaneous affections.

HYDRARGYRI CHLORIDUM CORROSIVUM — CORROSIVE CHLORIDE OF MERCURY.—This is the bichloride of mercury, commonly called *corrosive sublimate*, consisting of two equivalents of chlorine and one equivalent of mercury. It is made by subliming a mixture of chloride of sodium and bisulphate of the deutoxide of mercury (which is previously obtained by boiling mercury with sulphuric acid); a double decomposition takes place, resulting in the formation of bichloride of mercury and sulphate of soda. Corrosive sublimate occurs in the form of white, semi-transparent, crystalline masses, permanent in the air, inodorous, and of an acrid, styptic taste. It is tolerably soluble in cold water, and very soluble in boiling water, alcohol, ether, and the mineral acids. The aqueous

solution, when exposed to light, is decomposed, with the precipitation of calomel and evolution of hydrochloric acid. It is *incompatible* with many of the metals, the alkalies and their carbonates, soap, lime-water, tartar emetic, nitrate of silver, the acetates of lead, the sulphurets of potassium and sodium, and all the hydrosulphates. The *tests*, for detecting corrosive sublimate as a poison, are—in the order of their delicacy—ferro-cyanuret of potassium, lime-water, carbonate of potassa, iodide of potassium, ammonia, sulphuretted hydrogen, and protochloride of tin.

Physiological Effects.—In medicinal doses, as gr. $\frac{1}{16}$–$\frac{1}{8}$, corrosive sublimate occasions a beneficial alterative effect, without any obvious activity. Its continued use may cause salivation, but it has less tendency to produce this result than any other preparation of mercury. Medicinal doses, if too large or too long-continued, frequently produce gastro-enteric symptoms and the constitutional effects of mercury. In excessive doses, corrosive sublimate is a violent *caustic poison*, from its affinity for albumen, fibrin, and other constituents of the tissues. It produces the most intense gastro-enteritis, sometimes followed by the ordinary constitutional effects of mercury. The best *antidote* is *albumen* (in the form of white of eggs); or, if this is not attainable, *gluten* (in wheat flour), or *casein* (in milk), may be substituted. The *hydrated sulphuret of iron*, and a mixture of *iron filings* (two parts) with *zinc* (one part), also decompose corrosive sublimate. In cases of poisoning, the stomach must be evacuated as soon as possible, and the after treatment consists in the free use of demulcents, opiates, and topical depletion.

Medicinal Uses.—Corrosive sublimate is chiefly used as an alterative in secondary syphilis, usually in combination with the alterative diaphoretics, as the compound syrup of sarsaparilla; also in cutaneous and rheumatic affections, and as a sorbefacient in old dropsies. *Dose*, gr. $\frac{1}{16}$–$\frac{1}{8}$, three or four

times a day, in pill or solution. *Externally*, it may be used as a caustic; a weak solution (gr. ½–i–ij to water f℥i), is much employed as a wash to ulcers, an injection in gleet, a collyrium, &c. An ointment (gr. ½–i–ij to lard ℥i), is a good application in porrigo.

HYDRARGYRI IODIDUM—IODIDE OF MERCURY—is made by rubbing mercury and iodine together, with the addition of a little alcohol. It is a protiodide, consisting of one equivalent of iodine and mercury each, and is a yellowish-green powder, insoluble in water and alcohol, but soluble in ether. By exposure to light it is partially decomposed, and becomes of a dark-olive colour.

Effects and Uses.—This mercurial exercises a specific influence over the lymphatic and glandular system, and is employed in syphilis and scrofula occurring in the same individual. *Dose*, gr. i, gradually increased to gr. iij or iv; it should not be given with iodide of potassium, which decomposes it. *Externally*, it is applied, in the form of ointment, to syphilitic ulcers, &c.

HYDRARGYRI IODIDUM RUBRUM—RED IODIDE OF MERCURY—is the biniodide, consisting of one equivalent of mercury and two equivalents of iodine. It is made by mixing solutions of iodide of potassium and bichloride of mercury, from which a double decomposition ensues, resulting in the formation of chloride of potassium in solution, and biniodide of mercury precipitated. It is a scarlet-red powder, insoluble in water, but soluble in alcohol and solutions of iodide of potassium, chloride of sodium, &c. It is a powerful irritant and caustic, and is employed in the same cases as the protiodide, though much more energetic. *Dose*, gr. $\frac{1}{16}$, gradually increased to gr. ¼, in pill or alcoholic solution. *Externally*, it is much used in the form of ointment.

HYDRARGYRUM AMMONIATUM—AMMONIATED MERCURY.—This preparation, commonly called *white precipitate*, is made by precipitating a solution of bichloride of mercury by ammonia; muriate of ammonia is formed in solution, and the *amido-chloride of mercury* is thrown down. It consists of one equivalent of protochloride of mercury and one of *amidogen* (or ammonia deprived of one equivalent of hydrogen). It is a perfectly white powder, insoluble in water and alcohol, decomposed by boiling water, inodorous, and has an earthy, afterwards metallic taste. It is largely adulterated, chiefly with sulphate of lime. Its *effects* are poisonous, but it is *used* only as an external application, in the form of *ointment* (*unguentum hydrargyri ammoniati*, ʒi to simple ointment ʒiss), to cutaneous eruptions, and to destroy pediculi.

HYDRARGYRI SULPHAS FLAVUS—YELLOW SULPHATE OF MERCURY.—This salt, commonly called *turpeth mineral*, is made by throwing the bisulphate of the deutoxide of mercury (as obtained from the action of sulphuric acid on mercury), into *boiling water;* the bisulphate is instantly decomposed, and a basic sesquisulphate of the deutoxide of mercury—*turpeth mineral*—is precipitated. It is an inodorous, lemon-yellow powder, of a rather acrid taste, and almost insoluble in water. It has been employed as an *alterative*, in doses of gr. ¼–½; as an *emetic*, in croup and chronic enlargement of the testis, in doses of gr. ij–v; and as an *errhine*, in chronic ophthalmia and diseases of the head. In an overdose, it is poisonous, ʒi having proved fatal.

HYDRARGYRI SULPHURETUM NIGRUM—BLACK SULPHURET OF MERCURY—or *Ethiops mineral*, is made by rubbing equal parts of mercury and sulphur together, till all the globules disappear. Its composition is an unsettled point, but it is probably a bisulphuret mixed with sulphur. It is a

heavy, tasteless, insoluble, black powder, very mild in its operation, and prescribed as an alterative in glandular and cutaneous affections. *Dose*, gr. v–xx, several times a day; but it is not much used.

HYDRARGYRI SULPHURETUM RUBRUM—RED SULPHURET OF MERCURY—or *Cinnabar* (which is found as a *native* combination), is manufactured by subliming a mixture of one part of sulphur and eight parts of mercury. It consists of one equivalent of mercury and two equivalents of sulphur, and occurs in the form of heavy, brilliant, deep-red, crystalline masses, which are inodorous, tasteless, entirely volatilizable by heat, and insoluble in water and alcohol. It is not employed internally, but is used in the way of *fumigation* in venereal ulcers of the throat and nose; ʒss may be thrown on a red-hot iron and inhaled; but the *black oxide* is a better substance for mercurial fumigation. Cinnabar is used as a paint, under the name of *vermilion*.

UNGUENTUM HYDRARGYRI NITRATIS — OINTMENT OF NITRATE OF MERCURY.—The *nitrate of mercury* is employed only in the form of ointment. This preparation, known as *citrine ointment*, is made by dissolving mercury in nitric acid, and adding the mercurial solution to a melted mixture of neats-foot oil and lard. The chemical changes which result here are not precisely known; but a subnitrate of the deutoxide of mercury is probably formed, with fatty acids and elaïdin. Citrine ointment has a fine yellow colour, and unctuous consistence; but, if not very carefully made, it becomes greenish, hard, and friable. It is an excellent stimulant and alterative application, much employed in porrigo, psoriasis, crusta lactea, impetigo, psorophthalmia, and a wide range of ulcerated and eruptive affections. It is best to dilute it, at first, with lard.

A *Solution of Pernitrate of Mercury*, sometimes called *Acid Nitrate of Mercury*, made by dissolving mercury in nitric acid, is employed as a caustic application in malignant ulcers.

IODINIUM—IODINE.

Iodine is an elementary non-metallic substance, found in the vegetable, animal, and mineral kingdoms of nature,—as marine plants, oysters, sponges, mineral springs, &c. It is chiefly manufactured from *kelp* (the impure soda obtained from the incineration of sea-weeds), in which it exists as an iodide of sodium. It occurs in crystalline scales, of a bluish-black colour and metallic lustre, of a strong, peculiar odour, and a hot, acrid taste. It is very volatile—evaporating even at common temperatures, is freely soluble in alcohol and ether, and but very slightly soluble in water. Its solubility in water is very much increased by the addition of certain salts, as the iodide of potassium, chloride of sodium, &c. Iodine may be detected in the minutest quantity by *starch*, which produces with it a deep blue colour; if in combination, the iodine must be first freed with a little nitric acid. Chloroform has also been proposed as a test.

Physiological Effects.—Iodine acts *locally* as an irritant; when applied to the skin it stains it yellow, and causes itching, redness, and desquamation; and, when inhaled in the form of vapour, it excites cough and heat in the air-passages. Taken internally, in *medicinal doses*, it frequently produces a remedial alterative and resolvent effect, without any obvious disturbance of the functions. Usually, patients become thin under its use, though sometimes its alterative action on the nutrition produces embonpoint. If administered in too large doses, or to persons of irritable stomachs, it produces subacute gastro-enteritis; and, when continued for a long time, it will produce gastro-enteric symptoms—headache,

giddiness, and other evidences of cerebro-spinal disturbance—marasmus—sometimes discoloration of the skin—occasionally salivation—and frequently a *wasting of the mammæ and testicles.* The influence of iodine on the secretions is uncertain, but it commonly stimulates them. In excessive doses, it may act as an irritant poison, and has even produced death; but such a result is rare. Enormous quantities have been taken with very slight effects. The absorption of iodine is shown by its presence in the blood and various secretions.

Medicinal Uses.—Iodine is a most valuable *resolvent* remedy, in chronic visceral and glandular enlargements, indurations, thickening of membranes, tumours, &c. It is chiefly employed in *bronchocele* and *scrofula*, but it is useful in every variety of chronic tumour and enlargement; also as an alterative in secondary syphilis and other chronic affections; and as an emmenagogue. Its *vapour* has been inhaled with benefit in chronic bronchitis and phthisis. It is a valuable *topical* remedy, and is applied in the form of tincture, with the greatest advantage, in the various cutaneous affections, lupus, erysipelas, rheumatism, gout, phlegmons, carbuncles, wounds, diseases of joints, poisoned parts, &c., &c.

Administration.—Iodine is rarely exhibited alone, but usually in conjunction with iodide of potassium (see p. 247). To avoid gastric irritation, it is best given after a meal, particularly when amylaceous substances have been taken, as it forms with them iodide of starch. Dose, gr. ¼–½, two or three times daily. *Liquor Iodinii Compositus—Compound Solution of Iodine*—(Iodine ℥vi; Iodide of potassium ℥iss; distilled water Oj), is the usual preparation in which iodine is administered internally,—dose, six drops, three times a day, in sweetened water, and gradually increased. The *tincture* (℥i to alcohol Oi), is of a deep-brown colour, and undergoes a gradual change, when kept long; water precipitates the iodine from it, and hence it is little employed internally,—

dose, gtt. x–xx, repeated and increased. *Externally*, it is extensively applied to erysipelatous and poisoned parts, chilblains, &c., &c. The *ointment—unguentum iodinii*—(made with iodine ℈i, iodide of potassium gr. iv, water ♏vi, and lard ʒj), is employed as a local application in goitre, scrofulous tumefactions, &c.; it does not keep well. *Unguentum iodinii compositum* (iodine ʒss, iodide of potassium ʒj, alcohol fʒj, lard ʒij), is used for the same purposes as the preceding; they both impart an orange colour to the skin. *Iodine baths* have been employed, with iodine and iodide of potassium dissolved in water, in a *wooden* bath-tub, in the proportion of iodine gr. iij, and iodide gr. vi, to a gallon of water.

Iodine is employed in medicine, in various chemical combinations. The *iodides of iron, lead,* and *mercury* have been noticed. The *iodide of starch* is highly recommended,—dose, a teaspoonful, three times a day, to be increased. The *iodide of zinc* is employed as a tonic and astringent. The *iodide of sulphur*, in the form of ointment, is used in various skin diseases.

POTASSII IODIDUM—IODIDE OF POTASSIUM.

This salt is prepared by treating an aqueous solution of potassa with iodine in slight excess. By this process, a mixture of iodide of potassium and iodate of potassa is obtained, and the iodate is afterwards deoxidized and converted into iodide by heat. Iodide of potassium consists of one equivalent of iodine and potassium, each. It occurs in semi-opaque, white, or transparent crystals, permanent in a dry air, rather deliquescent in a moist one, of an acrid saline taste, somewhat like that of common salt. It is readily soluble in water and alcohol, and its aqueous solution dissolves iodine, forming *ioduretted iodide of potassium*. It is frequently adulterated with other salts.

Effects and Uses.—The effects of iodide of potassium are analogous to those of iodine, but less energetic. *Locally*, it

acts as an irritant, and, in large doses, sometimes occasions nausea, vomiting, heat of stomach, and purging; but it may be given in larger doses, and for a longer period, than iodine, without causing gastro-enteric derangement. It stimulates the secretions, particularly those from mucous membranes, and very often produces coryza. Its constitutional effects are powerfully *alterative* and *resolvent*, and it is employed in *bronchocele*, *scrofula*, *secondary syphilis*, and other chronic diseases, particularly those accompanied with enlargements or indurations. It has been recommended in hydrocephalus.

Administration.—Dose, gr. iij–xv, or even more, three times a day, in solution. An *ointment* (℥i to lard ℥i), is employed for the same purposes as iodine ointment, and does not discolour the skin; it is, however, of feebler efficacy.

BROMINIUM—BROMINE—is an elementary body, bearing close chemical and medicinal affinities to iodine. It is obtained from the bittern of salt springs (largely near Freeport, Pa.), in which it exists as a bromide of magnesium. It is a volatile, red liquid, of a caustic taste, and a strong, disagreeable smell, sparingly soluble in water, more soluble in alcohol, and still more so in ether. Its *effects on the system* are very analogous to those of iodine, and it has been employed as an alterative resolvent in bronchocele, scrofulous tumours, skin diseases, &c., particularly in cases in which iodine does not answer, or has lost its activity. It is exhibited in *aqueous solution* (1 part to 40 parts of distilled water); dose, six drops, several times a day. Properly diluted, it is used as a wash for ulcers. In over-doses, bromine is an irritant poison, and has proved fatal; ammonia is said to be an *antidote*.

POTASSII BROMIDUM—BROMIDE OF POTASSIUM—a permanent, colourless, anhydrous, crystalline salt, of a pungent, saline taste, very soluble in water, and slightly soluble in al-

cohol,—has been used as a substitute for iodide of potassium, in bronchocele, scrofula, secondary syphilis, &c. Dose, gr. iij–x, three times a day, in pill or solution. It is, however, slower in its action than the iodide, and more apt to disagree with the stomach. *Bromides of iron* and of *mercury* have been also employed.

OLEUM MORRHUÆ—COD-LIVER OIL.

This is a FIXED OIL, obtained from the LIVER of Gadus Morrhua, or the *Common Cod*,—a well-known fish of the Northern Atlantic,—and probably, also, from the livers of several other species of Gadus. It is prepared by subjecting the livers to heat, either in boilers with water, or by means of steam externally applied, and afterwards draining off the liquid portion, from which the oil separates on standing. It is said to be sometimes procured also by expression. Three varieties are known, the *white* or *pale-yellow*, the *brownish-yellow*, and the *dark-brown*. They differ chiefly in the mode of preparation—the *pale* being prepared from fresh livers, the *dark-brown* from those which are collected at sea and have undergone putrefactive decomposition, and the *brownish-yellow* from those in which putrefaction has only partially commenced. The pale oil is the purest; the dark oil is the most offensive to the taste and smell, and the least acceptable to the stomach.

Cod-liver oil is of the consistence of lamp-oil, and has a peculiar odour and taste, resembling that of shoe-leather, which is usually prepared in the United States with this oil. These sensible properties are probably the best test of the genuineness of the oil, and it should be rejected if the smell and taste of shoe-leather are wanting, or if those of lamp-oil or fish-oil are very perceptible. The oil undergoes a gradual change from exposure to the air, and should therefore be kept in full and well-stoppered bottles. It contains a great variety

of *chemical constituents*, the most important of which are *fatty acids*, several *biliary principles*, a peculiar brown substance called *gaduin* (which is not, however, supposed to be the *active* ingredient), *iodine*, *chlorine*, and traces of *bromine*.

Physiological Effects.—The prolonged use of cod-liver oil, in doses which allow it to be retained by the stomach, produces very marked beneficial effects in a wide range of chronic diseases, dependent on a vitiated condition of the functions of digestion, assimilation, and nutrition. Its modus medendi is not well understood; some therapeutists believing it to act merely as a nutritive agent, valuable from the readiness with which it is assimilated—others attributing its curative powers to the iodine and bromine, or other principles which it contains. Its efficiency cannot, however, be ascribed to its nutritive qualities, as other highly nutritious oleaginous substances have no such curative powers. It appears to act, in some unknown way, as an *alterative stimulant* to the functions of assimilation and nutrition, rendering food more easily assimilable, and thus resisting the waste of the system occasioned by chronic diseases. The most striking feature, in its action on the economy, is *increase of weight;* and, usually, where it fails to increase the weight, it is of little service. In *large doses*, cod-liver oil produces nausea and diarrhœa, and these effects occasionally follow the use of medicinal doses.

Medicinal Uses.—Cod liver oil has long been known as a remedy in rheumatic diseases; and within the last ten years, it has come into extensive use, as an alterative in tuberculous and scrofulous affections. In the treatment of phthisis pulmonalis, it is now looked upon, in Great Britain and the United States, as superior to any other agent, and as possessing an undoubted power of arresting the progress of both the general and local symptoms, in this disease. Relatively, it produces more marked effect in the last than in the previous stages of phthisis. Over the various forms of scrofula, it

exercises also a very decided control—particularly glandular enlargements, ulcers, diseases of the joints and spine, ophthalmia, &c. In the various cutaneous affections, chronic rheumatism and gout, and the entire circle of chronic disorders, in which there is a tendency to marasmus, cod-liver oil is now employed. Its peculiar powers and merits require, however, to be more fully developed by time.—It is contra-indicated where there is a tendency to congestion or plethora, and its exhibition should be suspended (temporarily at least), in the treatment of phthisis, when intra-thoracic inflammation or hemoptysis is present. Its good effects are most conspicuous, in proportion to the youth of the patient.

Administration.—Dose, a tablespoonful three or four times a day, to be gradually increased as the stomach will permit; and it must be persevered with for a long time, before its good effects appear. It is best given in some aromatic water, or the froth of porter; and it may be rendered more acceptable to the stomach, by combination with one of the mineral acids. If it produce diarrhœa, astringents should be administered with it. It is used as a *clyster*, in cases of ascarides and lumbricoides; and *externally*, in cutaneous affections and opacity of the cornea.

ARSENICI PRÆPARATA—PREPARATIONS OF ARSENIC.

Metallic arsenic is inert, though, when swallowed, it may prove powerfully poisonous, by becoming oxidized and converted into arsenious acid. It is not used in medicine.

ACIDUM ARSENIOSUM — ARSENIOUS ACID,—sometimes called *White Arsenic*, *Oxide of Arsenic*, or *Arsenic*,—is obtained principally as a secondary product in the roasting of cobalt ores (the arseniurets of cobalt), in Saxony and Bohemia. It is afterwards purified by sublimation; and, when recently prepared, occurs in glassy, colourless, transparent masses, of a vitreous fracture, which gradually become white and opaque,

progressively from the surface inwards. It is sometimes kept in the shops in the form of a fine white powder; but, in this state, it is liable to adulteration with chalk or sulphate of lime, and it should therefore be always purchased in masses. It is volatilizable by heat, has no smell, and little or no taste; is soluble in water (completely so in boiling water, and more readily in either, when *transparent* than opaque), and also in alcohol and oils. Its chemical composition is one equivalent of arsenic and three equivalents of oxygen. *Arsenic acid* is composed of one equivalent of metal and five equivalents of oxygen.

Tests.—Owing to the frequent use of arsenious acid as a poison, a knowledge of the means of detecting its presence is of great importance. In the *solid* state, it may be recognised in the first place by its *volatility;* secondly, when thrown on burning charcoal, it is deoxidized, and gives out the *garlicky odour* of metallic arsenic; and, thirdly, if heated in a glass tube with charcoal or black flux, it sublimes and condenses in the form of a *metallic crust.* In *aqueous solution,* arsenious acid may be detected by the following reagents: *sulphuretted hydrogen,* which produces a *lemon* or *sulphur-yellow* sulphuret of arsenic; *ammoniacal nitrate of silver,* which produces a *canary-yellow* arsenite of silver; and *ammoniacal sulphate of copper,* which produces an *apple* or *grass-green* arsenite of copper. The sulphuret of arsenic may be *reduced,* and made to yield metallic arsenic, if heated with soda-flux or potash-flux. The most delicate test, however, of arsenious acid in solution is that of *nascent hydrogen,* termed *Marsh's test.* When the acid is submitted to the action of nascent hydrogen (evolved by the action of sulphuric acid on zinc), it is deoxidized, and unites with the hydrogen to form arseniuretted hydrogen gas. This gas has a garlicky odour, and is recognised by its burning with a bluish-white flame, which deposits on a plate of glass or porcelain, held over the jet, a black spot or ring, surrounded

by a larger white ring of arsenious acid. Another test, lately proposed, is that of *Reinsch*, and consists in boiling a solution of the acid with muriatic acid and copper-foil or wire, when the latter acquires a whitish coating of metallic arsenic. *When arsenious acid is dissolved with liquid organic substances*, it should first be separated from insoluble matters, by filtration, and the metallic arsenic may be then obtained by *Reinsch's process;* and the liquid or subliming tests afterwards applied. If the poison be mixed with *solid organic substances*, they should be cut up and boiled with water acidulated with muriatic acid, and the solution afterwards filtered, and again boiled, &c.

Physiological Effects.—Arsenious acid acts *locally* as an escharotic, by destroying the vitality of the parts to which it is applied. Its effects, when it is taken internally, in *medicinal doses*, are not, at first, very obvious. When continued for some time, it generally produces more or less heat and dryness of the throat and stomach, with nausea, increased secretion from the bowels and kidneys, irritation of the conjunctiva, and a peculiar swelling of the face, termed *œdema arsenicalis:* after the latter symptom appears, the medicine should be suspended. In *too long-continued* or *too large medicinal doses*, arsenious acid sometimes produces a sort of chronic poisoning, characterized by disorder of the digestive apparatus, conjunctivitis, œdema, salivation, a cutaneous eruption, loss of the hair and nails, paralysis, convulsions, and, if its use be persevered in, coma and delirium may result, terminating in death. In *excessive doses*, arsenious acid is a violent poison, usually destroying life by gastro-enteritis, in from one to two or three days. When very large quantities are taken, it sometimes acts on the cerebro-spinal system, producing death by narcotism, in a few hours. Occasionally, gastro-enteric and cerebro-spinal symptoms both occur. A few grains of arsenious acid may prove fatal.

Dissections, in cases of poisoning from this agent, reveal redness (sometimes accompanied with extravasations of blood), ulceration, softening, effusion of lymph, and even gangrene, in the alimentary canal. The blood is often fluid and dark-coloured. The absorption of arsenious acid into the system, after its administration, is shown by its presence in the blood, animal tissues, urine, &c.

Antidotes and Treatment in cases of Poisoning.—The evacuation of the contents of the stomach, by the stomach-pump or emetics, should be the first object in these cases. Demulcent drinks are to be also freely given. The HYDRATED PEROXIDE OF IRON should be administered, as soon as it can be procured, in the state of *pulp* or *magma*. It is prepared by the action of an alkaline solution on a sesquisalt of iron; *solution of ammonia* is directed, by the U. S. Pharmacopœia, to be added to a solution of the *tersulphate of the sesquioxide of iron* (which is obtained by the action of sulphuric and nitric acids on the sulphate of the protoxide). The hydrated peroxide of iron is a soft, moist, reddish-brown magma, which acts as an *antidote* to arsenious acid, by forming with it an insoluble, inert subarseniate of protoxide of iron. The dose is about twelve times the supposed amount of poison taken, and it should be given in the *fresh* and *pulpy* state, as it gradually loses its antidotical virtues when kept. The *subcarbonate* (*sesquioxide*) *of iron* also acts as an antidote, but is much less powerful than the pulpy hydrate. *Light magnesia* (which has not been too strongly calcined), and freshly-precipitated *gelatinous magnesia*, may be also used as antidotes. The after-treatment consists in the use of demulcents, opiates, local bloodletting, and, if necessary, stimulants.

Medicinal Uses.—Arsenious acid is a very valuable alterative remedy, but it must be exhibited with caution. It is employed with the greatest success in the treatment of *periodical affections*, as *intermittent fevers*, especially such as have

resisted the use of bark, or frequently re-appeared; in *chronic cutaneous affections*, particularly the scaly diseases (lepra, psoriasis, and pityriasis); also in *certain affections of the nervous system*, chorea in particular, over which it exercises a marked control; and in the tertiary forms of syphilis. As an *external application*, arsenious acid has been applied to indolent sinuses, lupus, onychia maligna, &c., either pure or mixed with several parts of sulphur; its use is, however, attended with danger of constitutional effects. It is an ingredient of various empirical compounds, employed in the treatment of cancer.

Administration.—Dose, gr. $\frac{1}{16}$ to gr. $\frac{1}{12}$, in pills with bread-crumb, three times a day, to be reduced when conjunctivitis appears, and suspended after the establishment of the *œdema arsenicalis;* and, after being taken a fortnight, it should always be intermitted for a day or two. It is less apt to occasion gastric irritability, when given immediately after a meal. The usual and safer form of exhibiting this remedy, is that of solution with potash, in the

LIQUOR POTASSÆ ARSENITIS—SOLUTION OF ARSENITE OF POTASSA, or *Fowler's Solution.*—This is prepared by boiling arsenious acid with a solution of carbonate of potassa—spirit of lavender being added to the solution when cold. It is a transparent liquid, of an alkaline reaction, and has the colour, taste, and smell of spirit of lavender. It is decomposed by the reagents which act upon arsenic, and is *incompatible* with infusions and decoctions of cinchona. Its *effects and uses* are analogous to those of arsenious acid, though some practitioners have denied their therapeutic identity. The *antidote* is the subacetate of the sesquioxide of iron, which renders inert all the salts of the acids of arsenic. *Dose*, gtt. v to gtt. x, three times a day. Each fluidrachm contains half a grain of arsenious acid. *A solution of arsenite of soda* has also been employed.

ARSENICI IODIDUM—IODIDE OF ARSENIC,—made by rub-

bing iodine and arsenic together, is a teriodide, consisting of one eq. of arsenic and three eq. of iodine. It is an orange-red, crystalline, volatilizable solid, wholly soluble in water, and has been used both *internally* and *externally* in skin diseases. *Dose*, gr. ⅛, three times a day; for external use, gr. iij to lard ʒi.

LIQUOR ARSENICI ET HYDRARGYRI IODIDI—SOLUTION OF IODIDE OF ARSENIC AND MERCURY.—This solution, known as *Donovan's Solution*, is prepared by boiling equal weights of iodide. of arsenic and red iodide of mercury in distilled water It is considered by some chemists to be merely an aqueous solution of the two iodides; by others, a solution of hydriodates of the oxides of the two metals. It has a pale-yellow colour, a slightly styptic taste, and is *incompatible* with the salts of morphia.

Effects and Uses.—This is a highly valuable alterative preparation, in the various forms of papular and scaly cutaneous affections. It was introduced by Mr. Donovan, of Dublin, in 1839, and has been a good deal employed in the United States. *Dose*, gtt. v to gtt. xx or more, three times a day.

AMMONIÆ MURIAS—MURIATE OF AMMONIA.

This salt, commonly termed *sal ammoniac*, is obtained from the *gas-liquor* of coal gas-works, and also in the preparation of animal charcoal from bones. It is brought in the *crude* state from Calcutta to England, where it is *refined* and exported. It occurs in white, translucent, tough, fibrous, hemispherical, convex-concave cakes, about two inches thick, difficult to powder, inodorous, of a pungent, saline taste, slightly deliquescent, very soluble in water, and less so in alcohol. It consists of one eq. of muriatic acid and one of ammonia, and is considered by some chemists to be a chloride of ammonium.

Effects and Uses.—The local action of muriate of ammonia is that of an irritant. In large doses it purges. In small

doses, after absorption, it proves a powerful resolvent alterative, with a slight sedative action on the vascular system, and an increased flow of the secretions generally. It is not much employed in Great Britain or the United States, but it is extensively used in Germany—as a refrigerant sedative in mild fevers attended with stoppage of the secretions—as a resolvent in organic enlargements—in amenorrhœa—and in catarrhs, urethritis, &c. Dose, gr. v–xxx, every two or three hours, in powder or mucilaginous solution. *Externally*, it is used in solution (immediately upon being dissolved), as a refrigerant lotion, and also as a discutient.

ORDER III.—ANTACIDS.

Antacids are medicinal agents, employed to neutralize acids in the primæ viæ and secretions. The alkalies and alkaline earths, and their carbonates, are the substances included in this division. The alkalies, in the concentrated state, destroy organization and act as corrosive poisons; they are administered internally, only in a state of extreme dilution. The alkaline carbonates produce a less intense chemical action on the tissues than the alkalies; and the bicarbonates are less active than the monocarbonates. The alkaline earths, particularly magnesia, are less energetic in their local action than the alkalies proper; and their carbonates manifest little or no chemical influence over the tissues.

When swallowed in a state of dilution, the *alkaline preparations* combine with the free acids which they encounter in the stomach. The salts which are thus formed, unless carried off by the bowels, are absorbed into the blood, and are thrown out by the secretions, especially by the kidneys. While in the stomach, besides neutralizing acids, the alkalies also promote the digestion and absorption of fatty substances, by forming with them an emulsion. After absorption, they

exert a liquefacient action on the blood, and render the urine alkaline. Their long-continued use disorders the functions of digestion and nutrition, produces a chronic deterioration of the blood, and sets up a cachectic condition somewhat analogous to scurvy.

In the *concentrated* form, the alkalies are employed as *escharotics*. The various alkaline preparations are administered *internally*, in the diluted form:—1. As *antacids*, in dyspepsia, accompanied with excess of acid in the primæ viæ—and they are probably also of advantage, in dyspeptic cases, by promoting the digestion of fatty matters. The neutralization of acid, in dyspepsia, by the alkaline preparations, is chiefly *palliative*; although their continued use often diminishes temporarily the tendency to acid secretion. The vegetable tonics are frequently combined with antacids, very advantageously, in the treatment of dyspepsia. 2. As *antidotes*, in cases of poisoning from acids. 3. As *antilithics*, to neutralize lithic acid, when it is separated in undue quantity by the urine; and, also, as *lithontriptics*, or solvents of calculi, especially lithates. They are improper when there is a tendency to the deposition of phosphates. 4. To relieve irritability of the urinary organs—cutaneous irritation—uterine irritation — pruritus ani, &c.—when these conditions of irritability are dependent, as is often the case, on excess of acid in the system. 5. As *diuretics* (see p. 201). 6. As *antiplastics* and *resolvents*, in inflammation.

The antacid preparations should be administered in a state of large dilution, with a view to facilitate their absorption, and to prevent an irritant and purgative action on the bowels.

POTASSÆ PRÆPARATA—PREPARATIONS OF POTASSA.

The preparations of potassa, employed as antacids, are the *Solution of Potassa*, *Carbonate of Potassa*, and *Bicarbonate of Potassa*. Besides their antacid, antiplastic, and diuretic

uses, the salts of potassa have been administered therapeutically in the treatment of *scurvy*. This employment of them is based upon the opinion, that scurvy is the result of a deficiency of potash in the food; and that by the exhibition of some saline preparation of these alkalies, the necessary alimentary ingredient is restored.

LIQUOR POTASSÆ—SOLUTION OF POTASSA,—is prepared by the action of lime on a solution of carbonate of potassa; the lime abstracts carbonic acid from the carbonate, and precipitates as carbonate of lime, leaving the free potassa in solution. Solution of potassa is a limpid, colourless liquid, without smell, of an acrid, caustic taste, and an alkaline reaction.

Effects and Uses.—The antacid, diuretic, antilithic, and resolvent properties and indications of this preparation have been described above. It is more irritant to the stomach than the carbonates of potassa, and is therefore less eligible for protracted use. In excessive quantity, it may act as an irritant and corrosive poison; oils and vegetable acids should be administered as antidotes. Dose, gtt. x–xx, largely diluted with sweetened water or mucilage. *Externally*, it is used, in a diluted state, as a stimulant lotion.

POTASSÆ CARBONAS—CARBONATE OF POTASSA.—This salt, as usually kept in the shops, is prepared by the purification of the impure carbonate of potassa, known as *pearlash*, which is obtained from wood-ashes, by lixiviation. Carbonate of potassa occurs in the form of a white, coarse, granular powder, of a nauseous, alkaline taste, and an alkaline reaction, —very soluble in water, but insoluble in alcohol. It is very deliquescent, forming, if long exposed to the air, an oily liquid with the water which it attracts. It consists of one equivalent of carbonic acid and one of potassa. Acids, acidulous salts, and many other substances, are incompatible with it. It is employed as an antacid, diuretic, antilithic, &c., in the dose of gr. x–xx, in some sweetened, aromatic

water. In large quantities, it acts as a corrosive poison, for which oils and vegetable acids are the antidotes.

As the *purified pearlash* of the shops is always more or less impure, a better salt, for internal use, is

POTASSÆ CARBONAS PURUS—PURE CARBONATE OF POTASSA,—commonly called *Salt of Tartar*, from its having been formerly obtained from cream of tartar. It is now made by calcining bicarbonate of potassa, which is thus deprived of its water of crystallization and an equivalent of carbonic acid, and is reduced to the state of carbonate. It differs from *purified pearlash* only in containing no impurities.

Liquor Potassæ Carbonatis — Solution of Carbonate of Potassa (℔j to distilled water f℥xij), is a convenient form for the administration of the salt. Dose, ♏x to f℥j, diluted.

POTASSÆ BICARBONAS—BICARBONATE OF POTASSA,—is made by passing carbonic acid through an aqueous solution of carbonate of potassa, till it is fully saturated. By filtration and evaporation, it is obtained in transparent, colourless crystals, having the shape of irregular eight-sided prisms with two-sided summits. They are inodorous, of a slight alkaline taste, permanent in the air, soluble in water, and insoluble in alcohol. The *effects and uses* of this salt are the same as those of the carbonate, but it is pleasanter in taste and less irritant to the stomach. Dose, ℈i to ʒi.

SODÆ CARBONATES—CARBONATES OF SODA.

The only preparations of soda, employed as antacids, are the *carbonates*. There are three sources of carbonated soda, viz.: native soda, the ashes of marine plants, and sulphate of soda. The native carbonate (called *natron*), is found in Egypt, Hungary, and other countries. Impure soda, obtained from the ashes of marine plants, is termed *barilla*

or *kelp*,—barilla, when it is derived from phenogamous plants growing near the sea, and kelp, when procured from cryptogamic plants growing in the sea. Carbonate of soda is now, however, chiefly made by artificial means, from sulphate of soda—which is obtained in part from the manufacturers of chlorinated lime, but principally by the action of sulphuric acid on chloride of sodium. The sulphate of soda is fused with ground limestone and coal, and forms a black mass called *British barilla*, which consists of a mixture of oxysulphuret of calcium, caustic lime, and coaly matter, with carbonate of soda. It is afterwards purified by lixiviation, calcination, and other processes.

SODÆ CARBONAS—CARBONATE OF SODA,—crystallizes in large, oblique, rhombic prisms, which are transparent, very efflorescent, of an alkaline, disagreeable taste, soluble in water, but insoluble in alcohol. When heated, they undergo the watery fusion, and part with their water of crystallization, which is entirely expelled at a red heat. The chemical composition of the salt is one equivalent of carbonic acid and one of soda; and perfect crystals have ten equivalents of water of crystallization. It is apt to contain sulphate of soda and common salt as impurities. Acids, acidulous salts, lime-water, earthy and metallic salts, &c., are incompatible with carbonate of soda.

Effects and Uses.—Carbonate of soda is less irritant, and has a milder and more agreeable taste, than carbonate of potash. Its effects are otherwise similar, and it is administered in the same cases. In over-doses, it is a corrosive poison, for which oils and acids are the *antidotes*. Dose, gr. x to ʒss, in powder, or dissolved in some bitter infusion. Owing to the variable quantity of water of crystallization which it contains, as kept in the shops, it is best given in the *dried* state.

SODÆ CARBONAS EXSICCATUS—DRIED CARBONATE OF

SODA.—This salt is deprived of its water of crystallization by heat, and occurs in the form of a white powder. Dose, gr. v–xv, in pill, made with soap and aromatics.

SODÆ BICARBONAS—BICARBONATE OF SODA,—is prepared by saturating the carbonate with carbonic acid. In the process followed in this country, the water contained in the carbonate, which is liberated during the progress of its saturation, is drained off. Thus obtained, the crystals have the form of the carbonate, but are opaque and porous. They usually occur in granular masses, of a snow-white colour, which are found in the shops in the form of powder. It is a permanent salt, of a slightly alkaline taste, and consists of two eq. of carbonic acid, one of soda, and one of water. By exposure to heat, it gradually parts with its carbonic acid, and at a red heat is converted into the anhydrous carbonate.

The *effects and uses* of this salt are the same as those of the carbonate, but it is less irritant and of a more agreeable taste. When administered as an antilithic, it is said to be less liable than the carbonate to induce phosphatic deposits. It has been used as a liquefacient, in infantile croup, in the dose of gr. i, every five minutes, to promote the expulsion of false membrane. Dose for an adult, gr. x to ʒss, which may be pleasantly taken in carbonic acid water, or made into *lozenges* with sugar and mucilage of tragacanth. *Soda Powders* consist of tartaric acid (gr. xxv) in one paper, and bicarbonate of soda (gr. xxx) in another. They are dissolved in separate portions of water, to the amount of half a pint in all, and, when mixed, form a pleasant *effervescing* draught. Bicarbonate of soda is an ingredient also of *Seidlitz Powders* (see p. 178).

AMMONIÆ PRÆPARATA—PREPARATIONS OF AMMONIA.

The preparations of ammonia (previously noticed under the head of *Stimulants*, p. 134), are administered as *antacids*,

in cases in which a *stimulant* action is not objectionable. *Spiritus Ammoniæ Aromaticus*—(*Aromatic Spirit of Ammonia*), is the preparation usually employed, and is an excellent antacid carminative in heartburn, attended with flatulence, nausea with syncope, &c.—Dose, gtt. xxx–f℥j.

MAGNESIÆ PRÆPARATA—PREPARATIONS OF MAGNESIA.

Magnesia (p. 173), and its *Carbonate* (p. 174), are employed as antacids in dyspepsia, sick-headache, gravel, &c., particularly where a laxative effect is also desirable. *Dose*, gr. x–xxx.

CALCIS PRÆPARATA—PREPARATIONS OF LIME.

The preparations of lime, employed as antacids, are *Lime-water*, *Precipitated Carbonate of Lime*, *Prepared Chalk*, and *Prepared Oyster-shell*. They are very useful in cases of acidity or irritability of the stomach, but their action on the bowels is the reverse of that of magnesia, and hence they can hardly be administered where there is a tendency to constipation. They are also much employed in diarrhœa, and occasionally as alterative resolvents in glandular enlargements, and as antispasmodics in nervous disorders.

Liquor Calcis—Lime-Water—sometimes called *Aqua Calcis*, is a saturated solution of lime (℥iv) in distilled, river, or rain water (cong. j). It is a colourless, inodorous liquid, of a disagreeable alkaline taste. By exposure to the air, it gradually absorbs carbonic acid, with the formation of insoluble carbonate of lime. It should therefore be kept in full, well-stoppered bottles, or they should contain some undissolved lime.

Effects and Uses.—Lime-water combines antacid and astringent properties, and is applicable to all the cases in which antacids are proper, where an astringent effect on the bowels is not objectionable. It is an excellent remedy in gastric irri-

debility, attended with nausea and vomiting, and may be given mixed with an equal part of milk, which disguises its unpleasant taste. A mixture of milk and lime-water is very useful in dyspepsia accompanied with vomiting of food. Lime-water is employed also in diarrhœa after inflammation has ceased, in phthisis, in diabetes, and as an alternative resolvent in cutaneous affections. *Externally*, it is used as a wash in tinea capitis, pityriasis, scabies, etc., as an application to foul ulcers, and as an injection in gonorrhœa and gleet. *Dose*, internally, ℥ss to ℥j—iv several times a day: for children f℥ss. *Liniment*, from equal parts of lime-water and linseed oil, is an excellent liniment in burns and scalds.

CALCIS CARBONAS PRÆCIPITATUS—PRECIPITATED CARBONATE OF LIME—is made by mixing boiling solutions of chloride of calcium and carbonate of soda. It is a fine white powder insoluble in water, and free from gritiness, but possessing no superiority over *prepared chalk*.

CRETA PREPARATA—PREPARED CHALK—is made from *chalk or whiting*, by levigation and elutriation. It occurs in little white conical loaves, which are tasteless, odourless, insoluble in water, but more soluble in carbonic acid water. It consists of one eq. of carbonic acid and one of lime. Its *effects* are those of an absorbent, antacid, and desiccant astringent. It is used in dyspepsia and gout, attended with an excess of acid in the system; also in diarrhœa; and, as it forms soluble salts of lime with the acids of the stomach, its employment has been suggested in rachitis. *Dose*, gr. x—xxx, in powder, or suspended in water with gum and sugar. *Mistura Cretæ* (*Chalk Mixture*), consists of chalk (℥ss), rubbed up with sugar and gum arabic (each ℥ij), and water and cinnamon water (each f℥iv)—dose, f℥ss, repeated. Laudanum and tincture of kino or of catechu are often added to this mixture, in the treatment of diarrhœa.

TESTA PRÆPARATA—PREPARED OYSTER-SHELL—differs

from prepared chalk, in containing animal matter united with the carbonate of lime, and is thought to be more acceptable to a delicate stomach. Dose, gr. x–xxx.

CLASS IV.—TOPICAL MEDICINES.

ORDER I.—IRRITANTS.

Irritants are medicines which are employed to produce irritation or inflammation of the parts to which they are applied. They may be subdivided into RUBEFACIENTS, EPISPASTICS, SUPPURANTS, and ESCHAROTICS. *Rubefacients* are used merely to produce redness of the skin. *Epispastics*, or *vesicants*, cause the exhalation of a serous fluid under the cuticle. *Suppurants* produce a crop of pustules. *Escharotics* have a chemical action on the tissues with which they are placed in contact, and decompose or destroy them.

RUBEFACIENTS.

Rubefacients are employed to remove congestion and inflammation, to rouse the capillary system in cases of local torpor, to relieve pain and spasm, and as stimulants to the general system, in coma, syncope, asphyxia, &c. They are adapted to cases in which a sudden and powerful but transient action is called for; but they may also be employed, where a slight and long-continued action is desired. In removing congestion and inflammation, rubefacients act by *revulsion;* they are chiefly useful in the forming stages or in light grades of inflammation. They are very serviceable local anodynes, when applied to painful parts—acting by a *substitutive* influence. As general stimulants, their efficacy in rousing the system depends partly on their action on the capillary circulation, and partly on the pain which they produce. They are most valuable in the coma or asphyxia resulting from poisons, drowning, &c., and are inferior to blisters in the cere-

bral oppression, which occurs in fevers, inflammations of the brain, &c.

Rubefacients are usually applied till pain and redness supervene. If kept too long on the skin, many of them will produce vesication and even gangrene; and, in cases of coma, particular caution is required, as the patient may not feel them till dangerous inflammation has occurred.

SINAPIS — MUSTARD.

MUSTARD SEEDS are obtained from two varieties of Sinapis, S. nigra, or Black Mustard, and S. alba, or White Mustard (*Nat. Ord.* Brassicaceæ), small annual European plants, cultivated in our gardens. S. nigra has become naturalized in some parts of the United States. *Black mustard seeds* are small, globular, of a deep-brown colour externally, and internally yellow. They are inodorous, except in powder; and, when rubbed with water, exhale a very strong, pungent smell. Their taste is bitterish, hot, and pungent. *White mustard seeds* are larger, yellowish externally, and of a less pungent taste, owing to the presence of a mucilaginous substance in their skin. The *powder* of both varieties (commonly called *flour of mustard*), is yellow, and is often adulterated with coloured wheaten flour. Both varieties yield their virtues wholly to *water*, and very slightly to alcohol.

Chemical Constituents.—Mustard seeds yield, upon pressure, a fixed oil. From the *black seeds* a very pungent *volatile oil*, containing sulphur, is afterwards obtained by distillation: *it does not pre-exist in the seeds, but is the result of the action of water upon a peculiar principle called sinapisin.* It is colourless or pale-yellow, rather heavier than water, of a very pungent odour, and an acrid, burning taste, and is the principle to which the black seeds owe their activity. From the *white seeds* no volatile oil is obtained; but, when treated with water, they yield an *acrid fixed principle*, which is analo-

gous in properties to the volatile oil of the black seeds. *It is the result of the reaction of water upon sulpho-sinapisin*, a peculiar ingredient of the white seeds. The development of the volatile oil in the black seeds, and of the acrid fixed principle in the white seeds, is supposed to depend upon the presence of an albuminous constituent, called *myrosyne*, which acts the part of a ferment in determining a reaction between water and the peculiar principles of the seeds. Myrosyne is rendered inert by heat, alcohol, and the acids; and water of the ordinary temperature is therefore the proper menstruum of mustard.

Effects and Uses.—Mustard is an acrid stimulant. In small quantities, it is stomachic; in larger doses, it proves emetic; and, in excessive doses, it will produce gastro-enteric inflammation. When applied to the skin, it is a rapid and powerful local excitant, speedily producing redness and pain, and, if long continued, it will develop vesication, ulceration, and even sphacelus. Mustard seeds have been used as a laxative in dyspepsia. When employed *internally*, however, it is chiefly as an emetic, in cases of torpor of the stomach, particularly after narcotic poisoning; and, by its stimulant action, mustard often rouses the gastric susceptibility when other emetics fail. *Dose*, as an emetic, from a large teaspoonful to a tablespoonful of the bruised seeds or powder. Its use in smaller quantity, as a condiment and stimulant of the digestive organs, is well known. In the form of *whey* (℥ss boiled in milk Oi), it is given as a diuretic in dropsy. The most general use of mustard is, however, as a cutaneous stimulant, in the form of *cataplasm* (termed a *sinapism*). This is made by mixing flour of mustard with a sufficient quantity of tepid water to give it proper consistence; and it may be diluted with wheat or rye flour, if a weaker effect is desired. Sinapisms are used, when a speedy and powerful rubefacient effect is required: they should be kept on till pain and redness are

produced, usually from a quarter of an hour to an hour, and, in cases of insensibility, their effects should be carefully watched. They are applied spread on linen, and covered with gauze, to prevent adhesion to the skin.

CAPSICUM.

Capsicum has been previously noticed as an *aromatic stimulant* (p. 136). It is a powerful rubefacient, useful in rheumatism, low fevers, &c., and is applied in the form of cataplasm, or as a lotion, mixed with heated spirit.

OLEUM TEREBINTHINÆ—OIL OF TURPENTINE.

The oil of turpentine (see pp. 141, 218), is a speedy and efficacious rubefacient, and sometimes produces a vesicular eruption. It is employed in low forms of disease, attended with coldness of the surface; as a counter-irritant in inflammation; and as a stimulating liniment in rheumatic and paralytic cases. It is often diluted with olive oil.

LINIMENTUM AMMONIÆ—LINIMENT OF AMMONIA.

This preparation, called also *volatile liniment*, consists of one part of *Solution of Ammonia* (see p. 134), and two parts of olive oil. It is an excellent application, as a counter-irritant, in affections of the throat and chest, &c.

PIX BURGUNDICA—BURGUNDY PITCH.

This is the prepared CONCRETE JUICE of *Abies excelsa*, or Norway Spruce (*Nat. Ord.* Pinaceæ), a lofty evergreen tree of Europe and Northern Asia. Abies picea, or the European Silver Fir, is said to be also a source of the drug. It is obtained by stripping off the bark and detaching the flakes of resinous matter which form upon the surface of the wound; they are afterwards melted in boiling water and strained. Burgundy pitch is principally collected in France, and derives

its name from Burgundy, in that kingdom. As it is imported into the United States, it is generally re-melted and strained, to free it from impurities; and, as found in the shops, it is a hard, brittle, opaque substance, of a yellowish or brownish-yellow colour, and a weak terebinthinate taste and smell; when applied to the body, it softens and becomes adhesive. It contains two resins, and a much smaller proportion of volatile oil than turpentine.

A *spurious Burgundy pitch* is made by melting together pitch, resin, and turpentine, and agitating the mixture with water.

Effects and Uses.—This is a gentle rubefacient, producing a slight degree of inflammation and serous effusion, without separating the cuticle. It occasionally produces a papillary or vesicular eruption; and sometimes, though rarely, occasions painful vesication and even ulceration. It is applied, in the form of *plaster*, to the chest in chronic pulmonary disorders, to the loins in lumbago, to the joints in chronic articular affections, and for the relief of local rheumatic pains in other parts.

Emplastrum Picis Burgundicæ—Burgundy Pitch Plaster, —consists of twelve parts of Burgundy pitch, melted with one part of yellow wax, which is used to give consistence to the pitch. *Emplastrum Picis cum Cantharide—Plaster of Pitch with Spanish Flies*,—consists of seven parts of Burgundy pitch, melted with one part of cerate of Spanish flies; this is commonly called the *warming plaster*, and is a more active rubefacient than Burgundy pitch, though it does not usually blister. The *Compound Galbanum Plaster* and *Opium Plaster* both contain Burgundy pitch.

PIX CANADENSIS—CANADA PITCH.

This is the prepared CONCRETE JUICE of Abies Canadensis, or Hemlock Spruce (*Nat. Ord.* Pinaceæ), a very lofty evergreen tree of Canada and the northern parts of the United

States. The pitch (sometimes called *hemlock pitch*), is a spontaneous exudation on the old trees. The portions of bark upon which it hardens are stripped from the tree and boiled, and the melted pitch is skimmed from the surface of the water. It undergoes a farther purification in the shops, by melting and straining, and is found in hard, brittle, opaque masses, of a dark yellowish-brown colour, a weak, peculiar odour, and scarcely any taste. It is more readily softened by heat than Burgundy pitch, and is therefore sometimes a less convenient application. Its constituents are resin, and a minute portion of volatile oil, called *oil of hemlock*. Its *effects* and *uses* are the same as those of Burgundy pitch.

Many other acrid substances are occasionally employed as *rubefacients*. GINGER (see p. 142), BLACK PEPPER (see p. 137), and GARLIC (see p. 216), are particularly deserving of mention.

EPISPASTICS.

Epispastics, called also *vesicants* and *blisters*, are medicines which, when applied to the skin, produce inflammation, accompanied by effusion of serum beneath the cuticle. Many of the rubefacients will blister, if kept on the skin a sufficient length of time; and, on the other hand, the action of vesicants may be made not to extend beyond rubefaction. The inflammation of the skin, caused by vesicants, is erysipelatous in its character, and may result in suppuration and even sloughing or gangrene. In inflammations of the dermoid tissues, as rubeola and scarlatina—in typhus under certain circumstances—and in extreme infancy,—vesicants often produce fatal consequences.

This class of agents is employed:—1. As *derivatives* or *revellents*, for the relief of internal inflammations. By determining the circulating fluid and the nervous energy to the

seat of their action, vesicants exert a powerful influence in the cure of distant inflammation. They are objectionable in the early stages of acute inflammation, before febrile action has been subdued, as they may excite the vascular system, and thus increase the inflammation of the affected organ. As regards the proper situation for applying vesicants, different theoretical opinions have been advanced; but experience has shown that, for the relief of internal inflammation, they cannot be applied too near the affected organ. 2. To substitute a healthy therapeutic inflammatory action, which subsides spontaneously, for a morbid action existing in the part to which they are applied. In this way vesicants are used for the cure of various cutaneous eruptions. 3. To relive pain, which they do partly by a derivative, and partly by a substitutive influence. 4. To break up morbid associations, by the powerful impression which they make on the nervous system, as in the cure of intermittent fever, spasmodic diseases, &c. 5. To stimulate the absorbing or secreting vessels of parts contiguous to the seat of their application; in this way, they are useful in promoting the absorption of dropsical effusions, in the treatment of un-united fracture, &c. 6. As general stimulants, in typhoid diseases, coma, syncope, &c. 7. As local stimulants in threatened gangrene, paralysis, &c. 8. As evacuants, chiefly for the purpose of local depletion. 9. To prepare a surface for the endermic application of medicines.

CANTHARIS—SPANISH FLIES.

Cantharis vesicatoria, or the Spanish Fly, is an insect from six to ten lines in length, by two or three in breadth, of a beautiful, shining, golden-green colour. It is found most abundantly in Spain, Italy, and the South of France, but occurs in all the temperate parts of Europe, and in Western Asia. The Spanish flies swarm on certain trees and shrubs, and may be detected at a considerable distance by their strong, fetid odour, which

tability, attended with nausea and vomiting, and may be given mixed with an equal part of milk, which disguises its unpleasant taste. A diet of milk and lime-water is very useful in dyspepsia, accompanied with vomiting of food. Lime-water is employed also in diarrhœa, after inflammation has been subdued, in diabetes, and as an alterative resolvent in glandular affections. *Externally*, it is used as a wash in tinea capitis, prurigo, scabies, &c., as an application to foul ulcers, and as an injection in leucorrhœa and gleet. *Dose*, internally, f℥ss to f℥iij–iv, several times a day; for children f℥i. *Linimentum Calcis* (equal parts of lime-water and flaxseed oil), is an excellent liniment in burns and scalds.

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ESCHAROTICS.

Escharotics (from ἐσχαρα, *an eschar*), called also *cauterants*, are medicines, which destroy the structure and vitality of the parts to which they are applied. The *eschar*, which their application produces, is followed by inflammation and suppuration in the surrounding tissues, by which the slough is separated from the living parts.

They are employed, 1. To effect the destruction of morbid growths, warts, condylomata, polypi, fungous granulations, &c. 2. To decompose the virus of rabid and venomous animals, and of chancres. 3. For the cure of violent inflammation, by their *substitutive* action, as when they are applied to the mucous or cutaneous surfaces, in gonorrhœal ophthalmia, erysipelas, poisoned parts, carbuncle, lupus, &c. 4. To stimulate indolent sinuses, ulcers, &c., where their influence is also of a *substitutive* character. 5. To open abscesses. 6. To form issues.

ARGENTI NITRAS FUSUS—FUSED NITRATE OF SILVER.

Lunar Caustic (described at length, p. 107), is the most commonly employed of the caustics. It has the advantage of not liquefying when applied, and its action is therefore confined to the parts with which it is brought in contact. It is used, to remove fungous granulations in wounds and ulcers, to destroy warts, to decompose and prevent the absorption of the syphilitic virus in chancres, to alter the action of indolent ulcers, sinuses, and fistulæ, to subdue the inflammatory action of paronychia, erythema, &c., to arrest the progress of erysipelas and cancrum oris, to cut short variolous pustules, to cure skin diseases by a substitutive action, and in inflammations of mucous membranes. In dilutions of various strength, it is resorted to in every variety of inflammation of the mucous membranes; when a full impression is desired, a solution of

gr. xx–xxx in distilled water f℥i, may be employed; for ordinary purposes, gr. ij to water f℥i.

POTASSA.

Caustic Potassa is prepared by the rapid evaporation of *Solution of Potassa* (see p. 259) with heat. While in the state of fusion, it is received into cylindrical iron moulds, and it occurs in the form of sticks, of a brownish, grayish, or bluish colour, a fibrous fracture, the odour of slaking lime, and a caustic, urinous taste. It dissolves in alcohol, and in less than its weight of water, and attracts both moisture and carbonic acid rapidly from the air. It is more or less impure as found in the shops. By digestion in alcohol, it is freed from impurities insoluble in this menstruum (as the carbonates of potassa), and it may be afterwards obtained quite white and pure by evaporation; it is then termed *alcoholic potassa*. The potassa of the shops is a *hydrate*, consisting of one eq. of water and one of potassa.

Effects and Uses.—It is a very powerful escharotic, and differs from lunar caustic, in extending its action to a considerable depth beneath the surface to which it is applied. It is used chiefly to open abscesses and form issues, and sometimes also to arrest the sloughing of carbuncles. When it is applied to the skin, this should be covered with linen spread with adhesive plaster, having a hole the size of the spot to be cauterized. A solution (℥ijss to f℥i of water), is used as a *rubefacient*.

Potassa cum Calce—Potassa with Lime,—is prepared by rubbing up equal parts of potassa and lime. It is made into a paste with a little alcohol, and is termed *Vienna paste;* it has also been formed into sticks. The presence of lime renders this a milder, less deliquescent, and more manageable caustic than potassa.

ACIDUM ARSENIOSUM—ARSENIOUS ACID.

This is a powerful escharotic (see p. 251), and is occasionally employed in lupus, onychia maligna, cancerous ulcers, and to change the action of indolent sinuses; but its use is attended with danger. It may be diluted with one or more parts of sulphur.

ZINCI CHLORIDUM—CHLORIDE OF ZINC.

This is also a powerful escharotic (see p. 107); and in addition to its corrosive properties, it appears to exercise a greater influence over the vital action of neighbouring parts than some of the other caustics. The separation of its eschar leaves very healthy and vigorous granulations, and it is one of the best applications that can be made to intractable indolent ulcers and sinuses.

HYDRARGYRI PERNITRATIS LIQUOR—SOLUTION OF PERNITRATE OF MERCURY.

This preparation (see p. 245), termed also the *acid* nitrate of mercury, is a valuable caustic application to malignant ulcers, &c.

HYDRARGYRI CHLORIDUM CORROSIVUM—CORROSIVE CHLORIDE OF MERCURY.

Corrosive Sublimate is more frequently used as a stimulant wash than as a caustic. For its properties, uses, and modes of application, see p. 240.

ACIDA MINERALIA—MINERAL ACIDS.

The mineral acids (see p. 109), are powerful escharotics, but are inconvenient for many uses, on account of the extension of their action beyond the point of application. On the other hand, they can be made to reach the bottoms

of sinuses and fistulæ, which are inaccessible to the solid caustics. Nitric acid, for such purposes, has no equal in the list of escharotics; it is also used to destroy warts. Properly diluted, the mineral acids are employed as injections, gargles, &c.; and in the form of ointment in skin diseases.

SULPHATE OF COPPER (see p. 105), and ALUM (see p. 129), are mild escharotics, but are chiefly used to remove fungous granulations in ulcers. The *actual cautery* and *moxa* have been alluded to under the head of HEAT (see p. 17).

ORDER II.—DEMULCENTS.

Demulcents, or *emollients*, are medicines which *soften* and relax the tissues, and, when applied to irritated or inflamed surfaces, diminish heat, tension, and pain. They consist chiefly of gum, or of a mixture of gum with saccharine and farinaceous substances, and form with water viscid solutions. Their constitutional effects are principally nutritive, though perhaps to some extent they relieve irritation in distant organs, by modifying the acridity of the secretions. Demulcent solutions are administered internally:—1. To sheathe and protect the gastro-enteric surface from the injurious effects of irritating substances—particularly acrid poisons. 2. To relieve irritation and inflammation of the alimentary canal, as in gastritis, enteritis, diarrhœa, and dysentery; and for this purpose they may be administered either by the mouth or rectum. 3. In catarrhal affections, in which they are probably useful, in part by the transmission of their lubricating and soothing effects on the fauces and œsophagus by reflex action to the laryngeal and bronchial membranes, and in part by modifying the acridity of expectorated matters. 4. In affections of the urinary passages, as ardor urinæ, cystitis, &c., and, in these cases, they act chiefly by diminishing the acridity of the secretions. 5. As agreeable drinks, to quench

thirst and promote the action of the secreting and exhaling organs, in febrile affections. Their effects, in these cases, are owing to the water which they contain, to which they are added merely for the sake of flavour, or with a view to a slight nutritive action. When administered with the object of increasing the proportion of the fluid parts of the blood, demulcents are termed *diluents*. 6. As light diet for the sick. 7. For pharmaceutical purposes, to suspend substances insoluble in water, &c.

Externally, mucilaginous solutions are extensively employed, to relieve the heat, swelling, and pain of inflammations, wounds, burns, &c.; to hasten suppuration, where inflammation is too far advanced for resolution; to cleanse foul and scabby ulcers; to promote suppuration from granulating surfaces, &c., &c. Mucilaginous and amylaceous substances are applied to inflamed and ulcerated parts, mixed with water so as to form soft masses, termed *cataplasms* or *poultices*. These are useful vehicles of heat and moisture to the skin.

ACACIA—GUM ARABIC.

Gum Arabic is the CONCRETE JUICE of Acacia vera, Acacia Arabica, and other species of Acacia (*Nat. Ord.* Fabaceæ), thorny or prickly trees or shrubs of Africa and Arabia. The gum exudes, either through natural cracks in the bark, or through incisions made to facilitate its exudation, and hardens on exposure. The most abundant yield is in the hot and dry weather, and is obtained from the sickliest trees. Several commercial varieties are known, as Turkey, Barbary, Senegal, India, &c., of which the two most important are Turkey gum and Senegal gum. 1. *Turkey gum* comes from the Levant or other parts of the Mediterranean, and is the kind usually found in the shops. It consists chiefly of small, irregular fragments, interspersed with larger pieces, of a whitish colour,

which is sometimes slightly tinged with yellow or reddish-yellow. It is lighter-coloured, more brittle, more readily soluble, and purer than other varieties, and is generally characterized by innumerable minute fissures pervading its substance. 2. *Senegal gum* comes from the western coast of Africa. It occurs in roundish or oval unbroken pieces, larger, less brittle, and breaking with a more conchoidal fracture than those of Turkey gum, sometimes whitish, but generally yellowish, reddish, or brownish-red. Both varieties are more or less transparent, hard, brittle, and pulverizable, and form a white powder. They are inodorous, with a feeble, slightly sweetish taste, and, when pure, dissolve wholly in the mouth. When kept in a dry place, they undergo no change by time.

Chemical Constituents.—Gum Arabic consists almost wholly of a peculiar proximate principle, usually termed *gum*, but latterly designated by chemists as *arabin*. It is soluble in hot or cold water, forming a viscid solution called *mucilage*, and is insoluble in alcohol, ether, and the oils. Alcohol precipitates gum from its aqueous solution; subacetate of lead (which is a delicate test), nitrate of lead, and solution of sesquichloride of iron also precipitate it from solution. Gums of inferior transparency and solubility contain *bassorin*, an inert principle, insoluble in water and alcohol.

Effects and Uses.—Gum Arabic is extensively employed, internally, as a demulcent in gastro-enteric inflammation, diarrhœa, dysentery, cases of acrid poisoning, &c.; as a lubricant to the fauces in catarrhal affections, and also as a vehicle for anodynes and expectorants in cough mixtures; and as a diluent and bland nutritive in fevers and inflammatory cases, where a rigid regimen is required. It is usually administered in solution (℥j to boiling water Oj, to be given when cool); in cases of irritation of the fauces, it may be taken in the mouth, and allowed slowly to dissolve. For pharmaceutical purposes, gum Arabic is much used to suspend insoluble

substances in water, and in making pills and lozenges. *Mucilago Acaciæ—Mucilage of Gum Arabic* (℥iv to boiling water Oss), is used in making pills, emulsions, &c.: it becomes sour by keeping. *Syrupus Acaciæ—Syrup of Gum Arabic* (℥ij to water f℥viij, with sugar ℥xv), is used for the same purposes. By dissolving equal parts of sugar and gum Arabic in water and evaporating, an agreeable demulcent is obtained, known as *gum pectoral*, which is sold as an imitation of *jujube paste*.

TRAGACANTHA—TRAGACANTH.

This is a CONCRETE JUICE obtained from Astragalus verus and other species of Astragalus (*Nat. Ord.* Fabaceæ). They are small shrubs found in Persia, Asia Minor, and countries bordering on the Levant—with numerous branches covered with imbricated scales and beset with spines. Tragacanth exudes spontaneously in the hot weather, and hardens as it exudes, in forms of various shape. It occurs in irregular, tortuous pieces, of a whitish or yellowish-white or occasionally a slightly reddish colour, somewhat translucent, resembling horn in appearance. It is hard and fragile, but very difficult of pulverization, has no smell, and very little taste. When heated with water, it swells and forms a paste, and, if agitated with an additional quantity, it forms a uniform mixture, from which it is, however, almost entirely deposited, upon standing a day or two. It contains two constituents, one soluble in water, resembling *arabin*, the other termed *tragacanthin*, which is probably identical with *bassorin*.

Effects and Uses.—Tragacanth is seldom given internally, on account of its difficult solubility. It is useful in suspending heavy insoluble powders, and answers better than gum Arabic to impart consistence to lozenges.

LINUM—FLAXSEED.

These are the SEEDS of Linum usitatissimum, or Common Flax (*Nat. Ord.* Linaceæ), an annual plant, of the height of two feet, originally a native of Eastern countries, but naturalized in Europe, and cultivated in all parts of the world. The SEEDS and OIL are both officinal. The seeds are about a line in length, oval, smooth, and glossy, of a brown colour externally, and yellowish-white within. They are inodorous, and have an oily, mucilaginous taste. They contain a *fixed oil*, a large proportion of *mucilaginous matter*, and various other ingredients; the mucilaginous matter, which is found chiefly in the husks of the seeds, consists, about one-half, of a principle insoluble in cold water, resembling *arabin*, and, about one-third, of a principle insoluble in water. The *oil* (*oleum lini*, or *linseed oil*), is obtained by expression from the interior part of the seeds; it is laxative in the dose of f℥i–ij, but is chiefly used, externally, as an ingredient of *linimentum calcis* (see p. 264).

Effects and Uses.—The *infusion* of flaxseed (℥ss—℥j to boiling water Oj), is an admirable demulcent, extensively employed, *internally*, in catarrh, bowel-complaints, nephritic and calculous complaints, strangury, &c.; and also as an *external* antiphlogistic application. Decoction is an improper mode of preparing a demulcent solution of flaxseed, as boiling extracts part of the oil; but it answers very well when it is used as a laxative enema. *Flaxseed meal*, mixed with hot water, forms a much-used emollient *poultice*. *Infusum lini compositum* consists of flaxseed ℥ss, liquorice root ʒij, boiling water Oi; it may be taken *ad libitum*, as a demulcent drink, in pectoral and urinary affections.

ULMUS—SLIPPERY ELM BARK.

This is the INNER BARK of Ulmus fulva, or Slippery Elm (*Nat. Ord.* Ulmaceæ), a lofty indigenous tree, which is found

throughout the United States, north of Carolina, and grows most abundantly west of the Alleghany Mountains. The inner bark is prepared for use by the removal of the epidermis; it is found in the shops in long flat pieces, of a fibrous texture, tawny on the outer surface and reddish on the inner, of a peculiar but not unpleasant smell, and a very mucilaginous taste. It affords a light, grayish, fawn-coloured powder. A large quantity of mucilaginous matter is contained in it, which is readily yielded to water. According to Dr. Wood, much of the bark lately brought into the market is inferior, containing but little mucilage; it is less fibrous and more brittle than the genuine bark.

Effects and Uses.—Slippery elm bark is a valuable demulcent, extensively and advantageously employed in dysentery, diarrhœa, genito-urinary diseases, catarrhs, &c. It is also highly nutritious. Externally, it is an excellent emollient application, in the form either of infusion, or of poultice made with the powder. It has been also recommended for the dilatation of strictures and fistulæ. The *infusion* (℥i to boiling water Oi) may be used *ad libitum*.

SASSAFRAS MEDULLA—SASSAFRAS PITH.

Sassafras pith is the PITH of the twigs of Sassafras officinale (see p. 199). It occurs in light, spongy, whitish, slender, cylindrical pieces, of a mucilaginous taste. It abounds in a gummy matter, which it yields readily to water, forming a limpid, viscid mucilage. This mucilage (℥i to boiling water Oi), is a pleasant demulcent drink in dyspeptic, nephritic, and catarrhal affections, and is much used as a soothing application in ophthalmia.

GLYCYRRHIZA—LIQUORICE ROOT.

This is the ROOT of Glycyrrhiza glabra (*Nat. Ord.* Fabaceæ), a small herbaceous, perennial plant, of the countries around the Mediterranean. It is imported from Sicily and

Spain; and a portion of the Sicilian root is said to be the product of G. echinata. As found in the shops, liquorice root is in long, wrinkled pieces, often worm-eaten, varying from a few lines to more than an inch in thickness, externally grayish-brown, internally yellowish, without smell, and of a sweet, mucilaginous, sometimes slightly acrid taste. The best pieces are of the brightest yellow internally. The powder is grayish-yellow, or, if it is powdered with the epidermis removed, pale sulphur-yellow. The constituents of liquorice root are, a peculiar, transparent, yellow, sweetish substance, termed *glycyrrhizin* (which is scarcely soluble in cold water, but soluble in boiling water and alcohol, and is insusceptible of the vinous fermentation), starch, albumen, an acrid resin, &c.

Effects and Uses.—A decoction of liquorice root (℥i boiled for a few minutes in water Oi), is a useful demulcent in dysenteric, catarrhal, and nephritic affections; it is also added to decoctions of acrid substances, to cover their taste and acridity. It should be made of the root, *deprived of its cortical part*, which is acrid and without demulcent virtues; by long boiling, the acrid resin is extracted. The powder is used in making pills (see p. 24).

Extractum Glycyrrhizæ—Liquorice,—is made by the evaporation of a decoction of the half-dried root. It comes to this country chiefly from Leghorn and Messina, and in part, also, from Spain; good liquorice is prepared too, in New York, and in England. *Crude liquorice*, when good, occurs in black, flattened, cylindrical rolls, about an inch in diameter, which are dry, brittle, with a shining fracture, of a very sweet, peculiar, slightly acrid taste, and are quite soluble in water. It is, however, much sophisticated, and, for internal use, is, generally, *refined*, by dissolving the impure extract in water, without ebullition, straining the solution, and evaporating; sugar is often mixed with it, and sometimes mucilage or glue. *Refined liquorice* is in small cylindrical pieces, not thicker

than a pipe-stem. Liquorice is a pleasant demulcent, much used as an addition to cough mixtures and lozenges, and to acrid infusions and decoctions. *Mistura Glycyrrhizæ Composita*—commonly called *Brown Mixture,*—consists of liquorice, gum Arabic, sugar, each ʒss; paregoric, f ʒij; antimonial wine f ʒi; sweet spirit of nitre f ʒss; water f ʒxii—dose, f ʒss.

CETRARIA—ICELAND MOSS.

Cetraria Islandica, or Iceland Moss (*Nat. Ord.* Lichenaceæ), is a foliaceous, erect lichen, from two to four inches high, found in the northern latitudes and mountainous districts of the new and old continents. It is principally obtained from Norway and Iceland; and, as found in the shops, consists of irregularly lobed and channeled coriaceous leaves, fringed at their edges with rigid hairs, of a brownish or grayish-white colour, darker on the upper surface, and sometimes marked with blood-red spots. It is almost odourless, and has a bitter mucilaginous taste; its powder is whitish-gray. It yields its virtues to boiling water, and consists chiefly of two kinds of amylaceous matter (one of which is coloured blue by iodine, and is termed *lichen-starch*), and a bitter principle, termed *cetrarin* or *cetraric acid;* it contains, besides, other peculiar acid principles.

Effects and Uses.—Iceland moss is a demulcent tonic, and is also highly nutritious. It is adapted to cases requiring a light aliment combined with a mild and acceptable tonic; and, from its demulcent properties, has a soothing influence in inflammations of the various mucous membranes. It is chiefly used in chronic affections of the pulmonary and digestive organs, in the form of decoction (ʒss to water Oiss, boiled to Oi), which may be taken *ad libitum.* By maceration in water or a weak alkaline solution, Iceland moss may

be deprived of its bitter principle; and it is then used as a mild nutritive demulcent.

CHONDRUS—IRISH MOSS.

Chondrus crispus, Carrageen or Irish Moss (*Nat. Ord.* Algaceæ), is a marine alga, found chiefly on the west coast of Ireland, where it is prepared for use by washing, bleaching, and drying. As found in the shops, it consists of fronds, from two to three or four inches long, mostly yellowish or dirty-white, but intermixed with purplish-red portions, nearly inodorous, and of a mucilaginous taste. It swells up in warm water, and is almost entirely dissolved when boiled. Its chief constituent is a peculiar mucilaginous principle, for which the term *carrageenin* has been proposed; and it contains also some mucus, resins, &c.

Effects and Uses.—It is a very agreeable nutritive demulcent, useful in bowel-complaints and pectoral affections. It may be given in the form of *decoction* (ʒss to water Oiss, boiled to Oj), flavoured with lemon-juice and sugar; or it may be made with milk or cream into *blanc-mange*, which forms an excellent light diet for the sick.

MARANTA—ARROW-ROOT.

Arrow-root is a FECULA, obtained from the ROOT of Maranta arundinacea (*Nat. Ord.* Marantaceæ), a perennial herbaceous plant, of the height of two or three feet, originally found in the West Indies, and now cultivated in both the West and East Indies, Florida, Ceylon, and Sierra Leone. The ROOT is a white, fleshy, scaly, articulated, cylindrical tuber, from six inches to a foot or more in length, furnished with long fibres, and giving origin to several tuberous stoles, similar to itself. It consists principally of fecula or starch, which is extracted from the roots when they are about a year old: they are washed and beaten into a pulp, which is stirred in

water, and the fibrous part wrung out by the hands; the milky liquor is strained and suffered to settle, and the subsiding mass is dried in the sun. It occurs in the form of a light opaque white powder, or small pulverulent masses, without odour or taste; and is brought to our market chiefly from the West Indies, and, to some amount also, from Georgia and Florida. The preferred kind is that which comes from Bermuda.

Arrow-root is a pure starch, insoluble in cold water. Its peculiar characteristic is the structure and appearance of its granules, *when viewed under a microscope;* and this affords the best means of distinguishing it from other feculæ, which are mixed with or sold for it. The granules of the genuine arrow-root are ovate-oblong, irregularly convex, with fine rings, a hilum or central cavity, and often short processes or spines.

Effects and Uses. — Arrow-root is a valuable nutritive demulcent, forming a very pleasant light diet in bowel-complaints and pulmonary and urinary affections. It is also much used as an article of food for infants. It is dissolved in boiling water (a tablespoonful to water Oi), and forms a gelatinous solution; a larger proportion of arrow-root makes a jelly-like mass. Lemon-juice and sugar, or wine and spices, may be added, according to the indication. It is generally made with milk, when used as a diet for infants.

TAPIOCA.

This is the FECULA of the ROOT of Janipha Manihot (*Nat. Ord.* Euphorbiaceæ), a South American shrub, some six or eight feet in height, cultivated also in the West Indies, where it is termed the *cassava* plant. The ROOT is a very large, white, fleshy tuber, and is found under two varieties, the *sweet* and *bitter;* the latter contains an acrid, poisonous juice, which is, however, volatile, and dissipated by heat.

Tapioca is obtained from the expressed juice of both varieties, from which it is deposited as a *starchy powder;* it is afterwards dried by heat, which causes the starch-grains to swell and agglomerate into small masses or lumps. It occurs in the form of irregular, hard, white, rough grains, of little taste, and partially soluble in cold water. In boiling water it swells up, and forms a transparent jelly-like mass, which constitutes an admirable *demulcent article of diet*, applicable to the same cases as arrow-root.

SAGO.

Sago is the prepared FECULA of the PITH of Sagus Rumphii, or the Sago Palm (*Nat. Ord.* Palmaceæ), a small tree of the Moluccas and other East India Islands. The immature stem contains a great mass of spongy medullary matter, which is extracted in the state of a coarse powder; this is mingled with water, and the mixture, upon standing, deposits the insoluble farina, which, when dried, constitutes sago. The sago of commerce is prepared by forming the meal into a paste with water, and rubbing it into grains. It is *refined* at Malacca and Singapore, so as to give the grains a fine pearly lustre, and in this state is called *pearl sago*. *Pearl sago* is the preferred variety, and is that which is now in general use. It is in small grains, about the size of a pin's head, hard, whitish, of a light-brown colour, inodorous, and nearly tasteless. *Common sago* is in larger, duller, browner grains, often mixed with a dirty-looking powder.

Sago is, chemically, a starch. Common sago is insoluble in cold water; but pearl sago is partially dissolved by it, owing to the heat which it has undergone. The only use of sago is as a bland, unirritating article of diet. It should be boiled some time in water (or milk, if preferred), and carefully stirred, to insure the thorough solution of the grains; the solution, after being strained, may be flavoured with

sugar, lemon-juice, wine, or spices, according to the requirements of the case.

HORDEUM—BARLEY.

Barley, as prepared for medicinal use, consists of the decorticated SEEDS of Hordeum distichon, and other species of Hordeum (*Nat. Ord.* Graminaceæ); well-known grains, supposed to be derived from Tartary, and now in cultivation in most parts of the world. The SEEDS are oval, oblong, marked with a longitudinal furrow, of a yellowish colour externally, white within, a faint odour, and a mild, sweetish taste. They contain starch, gluten, gum, sugar, fibrous matter, &c.

When made to germinate by warmth and moisture, and afterwards baked to deprive them of vitality, barley-seeds are termed *malt;* this process increases the nutritious properties of the grain, by increasing the proportions of sugar, starch, and gum. Deprived of its husk, the grain is termed *hulled barley*, and hulled barley, when ground, is *barley meal.* PEARL BARLEY is the grain with all the investments removed, and afterwards rounded and polished in a mill; it is thus freed from its fibrous matter, and is the only fit form for medicinal use. It consists of small, white, oval grains, with a dark longitudinal furrow on one side, and yields its virtues to boiling water. In the form of *decoction*, and suitably flavoured, it makes an exceedingly bland demulcent nutritive drink, in fevers and inflammatory cases; (℥ij, previously washed with cold water, are mixed with water Oss, and boiled for a short time; this water should be thrown away, and Oiv boiling hot are poured upon the barley, and boiled to Oij.) A decoction of *malt* is more nutritious; mixed with hops, it is termed *wort.*

SALEP—the prepared BULBS of Orchis mascula (*Nat.*

Ord. Orchidaceæ),—consists of small, oval, hard, heavy, semi-transparent, yellowish masses, of a yellowish colour, a feeble odour, and a mild mucilaginous taste. It contains, like tragacanth, two gums (one insoluble, the other soluble), and also starch. It is demulcent and highly nutritive, and is used in the same way as tapioca, sago, &c.

For external use, the ANIMAL FATS (as lard, mutton-suet, tallow, wax, and spermaceti) are employed as *emollients;* also some of the vegetable oils (as lard, olive, and almond). *Lard oil* is a good vehicle for anodyne enemata.

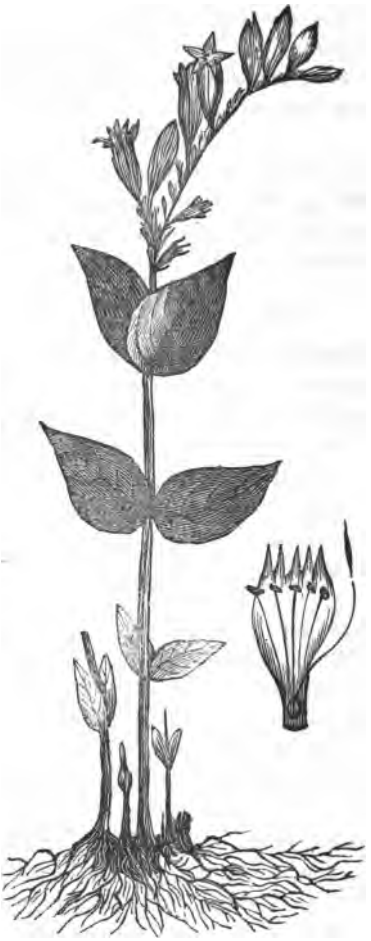
ORDER III.—ANTHELMINTICS.

Anthelmintics are medicines which promote the expulsion of worms from the alimentary canal. They act in different ways: some weaken or destroy the worms by a direct poisonous influence, others by mechanical means; the drastic cathartics have an anthelmintic effect, from the increased secretion and exhalation which they induce from the alimentary canal.

SPIGELIA—PINKROOT.

Pinkroot is the ROOT of Spigelia Marilandica, or Carolina Pink (*Nat. Ord.* Loganiaceæ), an herbaceous, indigenous plant, found chiefly in our Southern and Southwestern States. The root is perennial, and consists of a number of slender fibres; the stems are numerous, from a foot to a foot and a half high, of a purplish colour, furnished with sessile, opposite, ovate-lanceolate leaves, and terminate in spikes, bearing carmine-coloured funnel-shaped flowers, which appear from May to July. The ROOT, as found in the shops, consists of numerous slender, wrinkled, branching, brownish fibres, attached to a dark-brown caudex, and has a faint peculiar smell, and a sweetish, slightly bitter taste; its activity is dimi-

Fig. 23.



nished by time. Boiling water extracts its virtues, which are thought to depend upon *a bitter principle;* it contains also volatile oil, resin, and other matters.

Effects and Uses.—In ordinary doses, pinkroot often proves anthelmintic without any sensible effect on the system. In larger doses, it purges and sometimes vomits; and, in excessive doses, it operates as a narcotic poison, producing vertigo, dilated pupils, convulsions, and death. It is less apt to occasion narcotic effects when it acts on the bowels, and hence it is usually combined with or followed by cathartics. As an anthelmintic, it is considered the most reliable article we possess.

Administration.—Dose of the *powdered root*, ʒi–ij, for an adult; for a child three or four years old, gr. x–xx, to be repeated night and morning for three or four days, and followed by a brisk cathartic; calomel is sometimes combined with it. The *infusion* is the usual form of administration (ʒss to boiling water Oj, with frequently senna, ʒss), dose, f ʒss–j for a child two or three years old; f ʒiv–viij for an adult, night and morning. *The fluid extract of Spigelia and Senna* (which contains also carbonate of potassa and the oils of caraway and anise), is a pleasant preparation. Dose, f ʒss for an adult, f ʒj for a child.

CHENOPODIUM—WORMSEED.

Wormseed is the FRUIT of Chenopodium anthelminticum, or Jerusalem Oak (*Nat. Ord.* Chenopodiaceæ), an indigenous, herbaceous, perennial plant, from two to five feet high, with alternate, oblong-lanceolate, sinuated and toothed, yellowish-green leaves, and numerous small flowers of the same colour, arranged in long terminal panicles. Wormseed, as found in the shops, is in small spherical grains, not larger than a pin's head, of a dull, greenish-yellow or brownish colour, a peculiar offensive smell, and a rather aromatic,

pungent taste. Their sensible and medicinal properties are owing to a VOLATILE OIL (OLEUM CHENOPODII), obtained by distillation.

Fig. 24.

Effects and Uses.—Wormseed is a very efficient anthelmintic, particularly adapted to the expulsion of lumbrici from children. *Dose*, ℈i–ij for a child two or three years old, in

molasses, night and morning, for three or four days, to be followed by a brisk cathartic. The *oil* is more used than the fruit. Dose, gtt. v–x for a child, in emulsion with sugar. The expressed juice of the leaves, and a decoction made with milk, are also used.

AZEDARACH.

This is the BARK of the ROOT of Melia Azedarach, or Pride of China (*Nat. Ord.* Meliaceæ); an Asiatic tree, cultivated extensively as an ornamental tree in our Southern States. It has a bitter, nauseous taste, and yields its virtues to boiling water; but as it is used only in the recent state, it is not found in our shops. Its effects are said to resemble those of Spigelia. The decoction is the preferred form of administration (℥iv to water Oij, boiled to Oi); dose for a child f℥ss, every two or three hours, till it affects the stomach and bowels; or night and morning for several days.

MUCUNA—COWHAGE.

The BRISTLES of the PODS of Mucuna pruriens (*Nat. Ord.* Fabaceæ), a West Indian perennial climbing plant, act as anthelmintic, by a mechanical penetration of the worms. The PODS are about four inches long, shaped like the Italic letter *f*, and are covered with brown BRISTLY HAIRS, which, when handled, stick in the fingers, and produce an intense itching. *For administration*, the pods are dipped into syrup or molasses, and the hairs scraped off with the liquid, which should have the consistence of thick honey. *Dose*, a tablespoonful for an adult, a teaspoonful for a child, night and morning, for several days, and followed by a cathartic.

FILIX MAS—MALE FERN.

Aspidium Filix mas, or Male Fern (*Nat. Ord.* Filicales), is an indigenous plant, common to all parts of the world, with

a perennial, horizontal root, from which spring numerous annual, oval, lanceolate, acute, bright-green pinnate fronds or leaves, from a foot to four feet in height; the leaflets are deeply lobate, oval, crenate at their edges, and gradually diminish from the base of the pinna to the apex. The RHIZOMA is the portion used. It is a long, cylindrical caudex, covered with the remains of the leaf-stalks; and, as found in the shops, it is generally broken into fragments, of a brown colour externally, internally yellowish-white or reddish, with a peculiar feeble odour, and a sweetish, bitter, astringent, nauseous taste. It deteriorates by keeping. It contains volatile oil, fixed oil, resin, tannic and gallic acids, &c., &c. Its virtues are supposed to reside in the *ethereal extract*, which is the fixed oil in an impure state, containing volatile oil, resin, colouring matter, &c.

Effects and Uses.—Male fern possesses tonic and astringent properties; but its chief use is to cause the expulsion of tænia, which it destroys by a specific action. Its efficacy in this respect has been long and well attested. Dose, of the *powder*, ʒi–iij, in electuary or emulsion, night and morning for one or two days; of the *ethereal extract*, gr. x–xx, repeated; and in both cases a cathartic is to be afterwards given.

GRANATI RADICIS CORTEX—BARK OF THE POMEGRANATE ROOT.

The BARK of the ROOT of Punica granatum (see p. 123), is used for the expulsion of tænia. It is a powerful styptic, and may act in this way. It is given in *decoction* (ʒij to water Oij, boiled to Oi); dose, fʒij, or more.

OLEUM TEREBINTHINÆ—OIL OF TURPENTINE—(see p. 218), is used as a remedy for tænia and other worms. *Dose*, fʒi, combined with or followed by castor oil.

STANNI PULVIS—POWDERED TIN—acts as a mechanical anthelmintic. It is considered particularly adapted to the expulsion of *Ascaris lumbricoides*, and is also employed to expel tænia. *Dose*, ʒss, in molasses, for several mornings, and followed by a cathartic.

CALOMEL—(see p. 238) is a valuable anthelmintic, given in cathartic doses.

BRAYERA ANTHELMINTICA.—The FLOWERS of this plant, which is a native of Abyssinia, have recently been introduced into European practice, as a remedy for tænia, under the name of *kousso*. They are said to impart their virtues best to hot water, and to yield an extractive matter, containing tannic acid. A *decoction* (ʒi–iss to water Oi, boiled to Oss) is the form of administration recommended; but the medicine has been little, if at all, used in this country, where tænia is not common.

APPENDIX I.

SIGNS AND ABBREVIATIONS USED IN PRESCRIPTIONS.

℞, *Recipe*, take.
aa, *Ana* (ανα), of each.
℔, *Libra, libræ*, a pound, pounds.
℥, *Uncia, unciæ*, an ounce, ounces.
ʒ, *Drachma, drachmæ*, a drachm, drachms.
℈, *Scrupulus, scrupuli*, a scruple, scruples.
O, *Octarius, octarii*, a pint, pints.
f℥, *Fluiduncia, fluidunciæ*, a fluid ounce, fluid ounces.
fʒ, *Fluidrachma, fluidrachmæ*, a fluid drachm, fluid drachms.
♏, *Minimum, minima*, a minim, minims.

Ad 2 Vic., *Ad duas vices*, at two takings.
Ad Lib., *Ad libitum*.
Add., *Adde, Addantur*, add, let be added.
Altern. Horis, *Alternis horis*, every other hour.
Aq. Destil., *Aqua Destillata*, distilled water.
Aq. Ferv., *Aqua fervens*, hot water.
Aq. Fluvial., *Aqua fluvialis*, river water.
Aq. Font., *Aqua fontana*, spring water.
Aq. Pluv., *Aqua pluvialis*, rain water.
Bis Ind., *Bis indies*, twice a day.
Bull., *Bulliat, Bulliant*, let it or them boil.
Cap., *Capiat, capiendum*, let the patient take it, it must be taken.
Chart., *Chartula, chartulæ*, a small paper, or papers.
Cochleat., *Cochleatim*, by spoonfuls.
Coch. Mag., *Cochleare magnum*, a tablespoonful.
Coch. Med., *Cochleare medium*, a dessert-spoonful.
Coch. Parv., *Cochleare parvum*, a teaspoonful.

COL., *Cola, coletur*, strain, let it be strained.
COLLYR., *Collyrium*, an eye-water.
COMP., *Compositus*, compounded.
CONG., *Congius, congii*, a gallon, gallons.
C. M. S., *Cras mane sumendus*, to be taken to-morrow morning.
C. N., *Cras nocte*, to-morrow night.
DECOCT., *Decoctum*, a decoction.
DE D. IN D., *De die in diem*, from day to day.
DIEB. ALTER., *Diebus alternis*, every other day.
DIL., *Dilue, dilutus*, dilute, diluted.
DIM., *Dimidius*, one half.
DIV., *Divide*, divide.
D., *Doses*, a dose.
ELEC., *Electuarium*, an electuary.
ENEMA, *Enema, enemata*, a clyster, clysters.
EXHIB., *Exhibeatur*, let it be administered.
F. H., *Fiat haustus*, let a draught be made.
FIL., *Filtra*, filter.
FT., *Fiat, fiant*, let there be made.
GARG., *Gargarysma*, a gargle.
GR., *Granum, grana*, a grain, grains.
Gtt., *Gutta, guttæ*, a drop, drops.
GUTTAT., *Guttatim*, by drops.
HAUST., *Haustus*, a draught.
IND., *Indies*, daily.
INF., *Infunde*, pour in.
INFUS., *Infusum*, an infusion.
INJ., *Injiciatur*, let it be injected.
JUL., *Julepus, julepum*, a julep.
M., *Misce*, Mix.
MANE, in the morning.
MIST., *Mistura*, a mixture.
MIC. PAN., *Mica panis*, crumb of bread.
NO., *Numero*, in number.
OMN. HOR., *Omni horâ*, every hour.
OMN. BID., *Omni biduo*, every two days.
OMN. BIH., *Omni bihoris*, every two hours.
OMN. MAN., *Omni mane*, every morning.
OMN. NOCTE, *Omni nocte*, every night.

OMN. QUADR. HOR., *Omni quadrante horæ*, every quarter of an hour.
PH., Pharmacopœia.
POCUL., *Poculum*, a cup.
P. R. N., *Pro re natâ*, as the symptoms may call for.
PULV., *Pulvis*, a powder.
Q. P., *Quantum placeat*, as much as you please.
Q. S., *Quantum sufficiat*, enough.
QUOR., *Quorum*, of which.
REDIG. IN PULV., *Redigatur in pulverem*, let it be reduced to powder.
REPET., *Repetatur, repetantur*, let it or them be repeated.
S., *Signa*, write.
S. A., *Secundum artem*, according to art.
Semih., *Semihora*, half an hour.
SIGN., *Signatura*, a label.
Ss., *Semis*, a half.
SUM., *Sume, Sumendus*, take, let it be taken.
TABEL., *Tabella*, a lozenge.
TROCH., *Trochiscus*, a lozenge.
TRIT., *Tritura*, triturate.

APPENDIX II.

TABLE OF POISONS AND REPUTED ANTIDOTES.

(From Pereira's Materia Medica.)

Poisons.	*Forms.*	Antidotes.	*Form of Exhibition.*
Mineral acids	Sulphuric Sulphate of indigo Nitric Muriatic Nitro-muriatic	Alkalines Fixed oils	Magnesia with milk. Chalk (or whitening) with milk. Soap suds. Diluted solution of carbonate of soda. Almond, olive, or lamp oil.
Vegetable acids	Oxalic Tartaric Sal acetosellæ (quadroxalate of potash)	Chalk	Chalk (or whitening) with water.
Hydrocyanic acid	Diluted hydrocyanic acid Cyanide of potassium Essential oil of almonds Bitter almond water Laurel water	Ammonia and its carbonate	Carbonate of ammonia and water to be swallowed. Diluted ammonia to the nostrils. Artificial respiration of air impregnated with the vapour of ammonia.
		Mixed oxides of iron?	Dissolve ten grains of sulphate of iron in one ounce of water, and add one drachm of tinct. muriate of iron; to this solution add one scruple of carbonate of potassa, previously dissolved in one or two ounces of water. Administer the mixture immediately.
		Chlorine?	A few drops of a solution of chlorine, or nitro-muriatic acid, mixed with water, to be introduced into the stomach.

Alkalies	Potash, Soda, Ammonia, and their Carbonates	Acetic acid, or Citric acid	Vinegar and water, p. æ. Water, acidulated with acetic or pyroligneous acid. Sour beer. Aqueous solution of citric acid. Lemon, orange, or lime juice.
		Oil	Almond, olive, or lamp oil.
Earths	Caustic lime	Carbonic acid	Bottled soda water.
Barytic salts	Chloride of barium (muriate of baryta), Nitrate of baryta, Carbonate of baryta	Alkaline or earthy sulphates	Solution of sulphate of magnesia, or of sulphate of soda, or of alum. (For carbonate of baryta, a mixture of sulphate of magnesia and vinegar diluted.—A. S. Taylor.)
Arsenic	Arsenious acid, Arsenites, Arsenic acid	Lime-water	A mixture of oil and lime-water, or milk and lime-water.
		Hydrated magnesia	Light magnesia mixed with water.
		Hydrated sesquioxide of iron	Gelatinous hydrated sesquioxide of iron. A mixture of tinct. muriate of iron, or persulphate of iron, supersaturated by solution of ammonia. Ferri sesquioxydum (ferri carbonas) mixed with water.
		Animal charcoal	Purified animal charcoal. Common animal charcoal. Ivory black.
Antimony	Emetic tartar, Sesquichloride or butter of antimony	Tannic acid	Solution of tannic acid. Astringent decoctions (as of tea, nut-galls, cinchona, oak-bark, pomegranate, tormentilla, or uva ursi). Astringent tinctures (as of cinchona, catechu, or kino), diluted with water. Astringent extracts dissolved in water.
		Alkalines	See Mineral acids.

TABLE OF POISONS AND REPUTED ANTIDOTES—(*Continued.*)

Poisons.	*Forms.*	Antidotes.	*Form of Exhibition.*
Mercury	Corrosive sublimate Nitrate of mercury	Albuminosa	White of egg diffused in water. Yolk of egg diffused in water. Milk. Wheat flour mixed with water.
		Iron and zinc	A mixture of two parts of finely-divided iron (filings) and one part of zinc.—Bouchardat.
Copper	Sulphate Verdigris	Albuminosa	See Mercury.
Zinc	Sulphate Acetate Chloride	Albuminosa Alkalies	See Mercury. See Mineral acids.
Silver	Nitrate	Chloride of sodium	Common salt dissolved in water. Sea water.
		Albuminosa	See Mercury.
Lead	Oxides Carbonates Soluble salts	Alkaline or earthy sulphates	See Barytic Salts. (For carbonate of lead, a mixture of sulphate of magnesia and vinegar diluted.—A. S. Taylor.)
		Hydrosulphurets	A solution of sulphuretted hydrogen, or mineral sulphur water, to be drunk. Painters, workmen in lead factories, and others, whose skin is impregnated with lead, should employ, as a sulphurated bath, a solution of four ounces of sulphuret of potassium in thirty gallons of water.

Tin	Chloride (spirit of tin)	Albuminosa	See Mercury.
		Alkalines	See Mineral acids.
Iodine	Solid iodine / Tincture of iodine	Starch	Decoction of starch (wheat-starch, arrow-root, or tapioca). Flour and water. Boiled potatoes. Bread.
Opium Vegetable alkaloids and their salts Vegetables whose active principles are alkaloids, as belladonna, hyoscyamus, stramonium, colchicum, veratrum, &c.		Tannic acid	See Emetic tartar.
		Animal charcoal	See Arsenic.
Sulphuretted hydrogen Hydrosulphuret of ammonia (sulphuret of ammonium) Sulphuret of potassium		Chlorine	Air slightly impregnated with chlorine to be inhaled.
		Hypochlorite of soda	Dilute solution of chloride [hypochlorite] of soda to be swallowed.
		Hypochlorite of lime	Dilute solution of chloride [hypochlorite] of lime to be swallowed.

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APPENDIX II.

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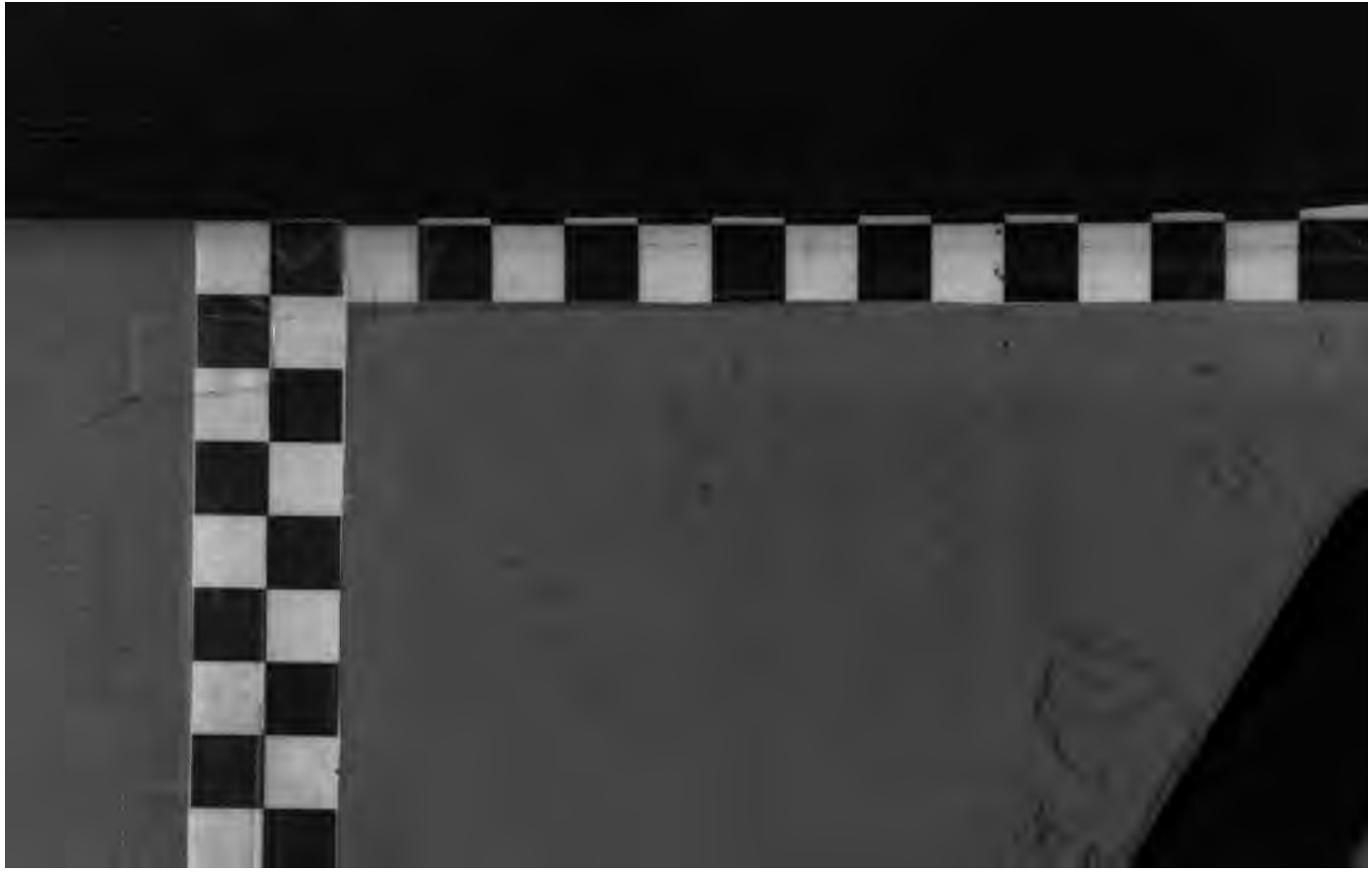
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